

# Extreme SLX-OS Command Reference, 17r.1.01a

Supporting the ExtremeRouting SLX 9850 and  
ExtremeSwitching SLX 9540 Devices

© 2018, Extreme Networks, Inc. All Rights Reserved.

Extreme Networks and the Extreme Networks logo are trademarks or registered trademarks of Extreme Networks, Inc. in the United States and/or other countries. All other names are the property of their respective owners. For additional information on Extreme Networks Trademarks please see [www.extremenetworks.com/company/legal/trademarks](http://www.extremenetworks.com/company/legal/trademarks). Specifications and product availability are subject to change without notice.

© 2017, Brocade Communications Systems, Inc. All Rights Reserved.

Brocade, the B-wing symbol, and MyBrocade are registered trademarks of Brocade Communications Systems, Inc., in the United States and in other countries. Other brands, product names, or service names mentioned of Brocade Communications Systems, Inc. are listed at [www.brocade.com/en/legal/brocade-Legal-intellectual-property/brocade-legal-trademarks.html](http://www.brocade.com/en/legal/brocade-Legal-intellectual-property/brocade-legal-trademarks.html). Other marks may belong to third parties.

Notice: This document is for informational purposes only and does not set forth any warranty, expressed or implied, concerning any equipment, equipment feature, or service offered or to be offered by Brocade. Brocade reserves the right to make changes to this document at any time, without notice, and assumes no responsibility for its use. This informational document describes features that may not be currently available. Contact a Brocade sales office for information on feature and product availability. Export of technical data contained in this document may require an export license from the United States government.

The authors and Brocade Communications Systems, Inc. assume no liability or responsibility to any person or entity with respect to the accuracy of this document or any loss, cost, liability, or damages arising from the information contained herein or the computer programs that accompany it.

The product described by this document may contain open source software covered by the GNU General Public License or other open source license agreements. To find out which open source software is included in Brocade products, view the licensing terms applicable to the open source software, and obtain a copy of the programming source code, please visit <http://www.brocade.com/support/oscd>.

# Contents

---

<b>Preface</b> .....	<b>29</b>
Document conventions.....	29
Notes, cautions, and warnings.....	29
Text formatting conventions.....	29
Command syntax conventions.....	30
Extreme resources.....	30
Document feedback.....	30
Contacting Extreme Technical Support.....	31
<b>About This Document</b> .....	<b>33</b>
Supported hardware and software.....	33
Interface module capabilities.....	33
What's new in this document.....	33
New commands.....	34
Modified commands.....	34
<b>Commands A - B</b> .....	<b>35</b>
aaa accounting.....	35
aaa authentication .....	38
acl-mirror.....	40
acl-policy.....	42
action-profile .....	43
action python-script.....	44
action-timeout.....	46
activate (Telemetry collector).....	47
activate (Telemetry server).....	48
activate (VXLAN overlay gateway).....	49
adaptive.....	50
address-family l2vpn evpn (BGP).....	52
address-family unicast (BGP).....	53
address-family unicast (IS-IS).....	55
adjustment-interval.....	56
adjustment-threshold.....	57
admin-group.....	58
advertise dot1-tlv .....	60
advertise dot3-tlv .....	61
advertise-backup .....	62
advertise optional-tlv .....	63
advertisement-interval (VRRP).....	65
advertisement-interval-scale .....	67
aggregate-address (BGP).....	68
alias .....	70
alias-config .....	72
allow-conflicting-rules.....	73
allow-duplicate-rules.....	75
always-compare-med .....	77
always-propagate .....	78

anycast-rp.....	80
area authentication (OSPFv3).....	82
area nssa (OSPFv2).....	84
area nssa (OSPFv3).....	86
area prefix-list (OSPFv2).....	88
area range (OSPFv2).....	90
area range (OSPFv3).....	92
area stub (OSPFv2).....	94
area stub (OSPFv3).....	96
area virtual-link (OSPFv2).....	98
area virtual-link (OSPFv3).....	100
area virtual-link authentication (OSPFv3).....	102
arp .....	104
arp access-list.....	106
as-path-ignore .....	108
auth-check.....	109
auth-key.....	111
auth-mode.....	113
auth-port.....	115
autobw-threshold table.....	116
auto-cost reference-bandwidth (OSPFv2).....	117
auto-cost reference-bandwidth (OSPFv3).....	119
auto-shutdown-new-neighbors.....	121
backup-advertisement-interval .....	122
bandwidth-ceiling.....	123
banner.....	125
beacon enable.....	126
bfd.....	128
bfd holdover-interval.....	130
bfd interval.....	132
bfd shutdown.....	134
bgp-redistribute-internal .....	135
bpdu-drop-enable.....	136
breakout mode 4x10g.....	137
bridge-domain (EVPN default instance).....	138
bridge-domain.....	140
bridge-priority .....	142
bsr-candidate.....	144
bypass-lsp.....	146
<b>Commands C - D.....</b>	<b>147</b>
capability as4-enable .....	147
ccm-interval.....	148
certutil import sshkey .....	149
cfm y1731 domain .....	151
cfm linktrace.....	152
cfm loopback.....	154
channel-group .....	156
chassis .....	158
cisco-interoperability .....	160
class .....	161

class-map .....	163
clear arp .....	164
clear bfd neighbors.....	166
clear bgp evpn neighbor.....	167
clear bgp evpn routes.....	169
clear cfm y1731 statistics .....	171
clear cfm y1731 statistics delay-measurement .....	172
clear cfm y1731 statistics synthetic-loss-measurement .....	173
clear counters .....	174
clear counters access-list .....	175
clear counters access-list overlay type vxlan .....	177
clear counters storm-control .....	178
clear dot1x statistics .....	180
clear ip bgp dampening .....	181
clear ip bgp flap-statistics .....	182
clear ip bgp local routes .....	183
clear ip bgp neighbor .....	184
clear ip bgp routes .....	186
clear ip bgp traffic .....	187
clear ip dhcp relay statistics .....	188
clear ip ospf .....	189
clear ip route .....	191
clear ipv6 bgp dampening .....	192
clear ipv6 bgp flap-statistics .....	193
clear ipv6 bgp local routes .....	194
clear ipv6 bgp neighbor.....	195
clear ipv6 bgp routes.....	197
clear ipv6 bgp traffic.....	198
clear ipv6 counters .....	199
clear ipv6 dhcp relay statistics .....	200
clear ipv6 neighbor.....	201
clear ipv6 ospf .....	202
clear ipv6 route.....	204
clear ipv6 vrrp statistics .....	205
clear isis all .....	207
clear isis counts .....	208
clear isis database .....	209
clear isis force-spf .....	210
clear isis force-v6spf .....	211
clear isis ipv6 spf-log .....	212
clear isis neighbor .....	213
clear isis route .....	214
clear isis spf-log .....	215
clear isis traffic .....	216
clear lacp .....	217
clear lacp counters .....	218
clear link-oam statistics.....	219
clear lldp neighbors.....	220
clear lldp statistics.....	222
clear loop-detection.....	224

clear mac-address-table.....	226
clear mpls auto-bandwidth-samples.....	228
clear mpls lsp.....	229
clear mpls statistics.....	230
clear openflow .....	232
clear overlay-gateway .....	233
clear policy-map-counters .....	234
clear spanning-tree counter .....	235
clear spanning-tree detected-protocols .....	237
clear statistics bridge-domain.....	239
clear statistics openflow .....	240
clear statistics vlan.....	241
clear tm voq-stat ingress-device.....	242
clear tm voq-stat slot .....	243
clear tunnel statistics.....	244
clear udd statistics .....	245
clear vrrp statistics.....	246
CLI.....	248
client.....	251
client-interface.....	252
client-interfaces-shutdown.....	253
client-isolation.....	254
client-pw.....	256
client-to-client-reflection .....	257
clock set .....	259
clock timezone.....	260
cluster.....	261
cluster-id .....	262
commit.....	263
compare-med-empty-aspath .....	264
compare-routerid .....	265
confederation identifier.....	266
confederation peers.....	267
configure terminal .....	268
connector.....	269
copy .....	270
cos.....	272
cos .....	273
crypto ca authenticate.....	274
crypto ca enroll.....	276
crypto ca import.....	278
crypto ca trustpoint.....	280
crypto key .....	281
csnp-interval.....	283
cspf-computation-mode.....	284
cspf-interface-constraint.....	286
cspf-group.....	287
cspf-group-computation.....	288
dampening .....	290
database-overflow-interval (OSPFv2).....	292

database-overflow-interval (OSPFv3).....	294
debug access-list-log buffer .....	296
debug arp packet buffer.....	297
debug dhcp packet buffer .....	299
debug dot1x packet.....	301
debug ip bgp .....	303
debug ip bgp neighbor .....	305
debug ip igmp .....	307
debug ip pim .....	309
debug ipv6 bgp.....	311
debug ipv6 bgp neighbor.....	313
debug lacp .....	315
debug lldp dump .....	317
debug lldp packet .....	319
debug spanning-tree .....	321
debug uddl packet .....	323
default-information-originate (BGP).....	325
default-information-originate (IS-IS).....	326
default-information-originate (OSPFv2).....	327
default-information-originate (OSPFv3).....	329
default-link-metric.....	331
default-local-preference .....	333
default-metric (BGP).....	334
default-metric (IS-IS).....	335
default-metric (OSPF).....	336
default-passive-interface .....	337
delay.....	338
delay-link-event.....	339
delete .....	341
delete-packet.....	342
deploy.....	344
description (BD).....	346
description (event-handler).....	347
description (interfaces).....	348
description (LLDP).....	349
description (STP).....	350
description (VRRP).....	351
designated-forwarder-hold-time.....	352
destination .....	353
dhcp ztp cancel.....	354
dhcp ztp log.....	355
dir .....	357
disable.....	358
disable-adjacency-check.....	359
disable-incremental-spf-opt.....	360
disable-inc-stct-spf-opt.....	361
disable-partial-spf-opt.....	362
discard-packet.....	363
discard-voq-packet.....	365
distance (BGP).....	367

distance (IS-IS).....	368
distance (OSPF).....	369
distribute-list prefix-list (OSPFv3).....	371
distribute-list route-map .....	372
domain-name.....	373
dot1x authentication .....	374
dot1x enable.....	375
dot1x reauthenticate .....	376
dot1x filter-strict-security.....	377
dot1x max-req .....	379
dot1x port-control.....	380
dot1x reauthentication .....	382
dot1x reauthMax .....	383
dot1x quiet-period .....	384
dot1x test eapol-capable .....	385
dot1x test timeout .....	386
dot1x timeout .....	387
dpod .....	389
dscp (QoS).....	391
dscp (Tunnel).....	392
dscp-ttl-mode.....	393
duplicate-mac-timer (EVPN default instance).....	394
dynamic-bypass.....	395
<b>Commands E - F.....</b>	<b>397</b>
encryption-level.....	397
enforce-first-as .....	399
enable.....	400
enable-all-interfaces.....	401
eol.....	402
error-disable-timeout enable .....	403
error-disable-timeout interval .....	404
esi.....	406
event .....	408
event-handler.....	410
event-handler abort action.....	412
event-handler activate.....	413
evpn.....	416
exclude-any.....	417
exclude-interface.....	419
exp.....	421
export-vrf-leaked-routes .....	423
export-map .....	424
extend bridge-domain .....	425
extend vlan .....	426
external-lsdb-limit (OSPFv2).....	428
external-lsdb-limit (OSPFv3).....	429
facility-backup.....	430
fast-external-fallover .....	432
fast-flood.....	433
fastboot.....	434



filter-fec-in.....	435
filter-fec-out.....	437
firmware activate .....	438
firmware commit .....	439
firmware download .....	440
firmware download fullinstall .....	443
firmware download ftp .....	446
firmware download interactive .....	448
firmware download scp .....	450
firmware download sftp .....	452
firmware download tftp .....	454
firmware download usb .....	456
firmware recover .....	458
firmware restore .....	459
flex-cli show link-fault-signaling .....	460
flex-cli show local-fault interface .....	461
flex-cli show local-fault slot .....	463
flex-cli show remote-fault interface .....	464
flex-cli show remote-fault slot .....	465
forward-delay .....	466
from.....	468
<b>Commands G - J.....</b>	<b>471</b>
graceful-restart (BGP).....	471
graceful-restart (LDP).....	474
graceful-restart (OSPFv2).....	475
graceful-restart helper (OSPFv3).....	477
graceful-restart helper-disable (IS-IS).....	478
ha chassisreboot .....	479
ha disable .....	480
ha enable .....	481
ha failover .....	482
ha sync start .....	483
ha sync stop .....	484
handle-isis-neighbor-down.....	485
hardware.....	487
hello (LLDP).....	488
hello (MPLS RSVP).....	490
hello (UDLD).....	492
hello padding.....	493
hello-acknowledgements.....	495
hello-interval.....	496
hello-interval (LDP) .....	497
hello-interval (PIM).....	498
hello-interval-link .....	499
hello-interval-target .....	500
hello-time .....	501
hello-timeout (LDP) .....	503
hello-timeout-link .....	504
hello-timeout-target .....	505
helper-only.....	506

hold-time .....	507
hop-limit.....	508
hostname disable.....	510
image-snapshot create.....	511
implicit-commit.....	512
import-map .....	514
inactivity-timer.....	515
include-all.....	516
include-any.....	518
ingress-tunnel-accounting.....	520
insight enable.....	521
insight mode.....	523
install-igp-cost .....	524
instance .....	525
interface ethernet.....	527
interface loopback .....	528
interface management.....	530
interface port-channel.....	531
interface ve .....	532
interval.....	533
ip access-group .....	534
ip access-list .....	536
ip address .....	538
ip address (site).....	540
ip arp inspection.....	541
ip arp inspection filter.....	542
ip arp inspection trust.....	544
ip arp-aging-timeout .....	546
ip dhcp relay address .....	548
ip dhcp relay gateway address.....	549
ip dns .....	550
ip icmp rate-limiting .....	551
ip icmp redirect.....	552
ip igmp immediate-leave .....	553
ip igmp last-member-query-interval .....	554
ip igmp query-interval .....	555
ip igmp query-max-response-time .....	556
ip igmp router-alert-check-disable.....	557
ip igmp snooping enable .....	558
ip igmp snooping fast-leave .....	559
ip igmp snooping last-member-query-interval.....	560
ip igmp snooping mrouter interface .....	561
ip igmp snooping querier enable .....	562
ip igmp snooping query-interval.....	563
ip igmp snooping query-max-response-time.....	564
ip igmp snooping static-group.....	565
ip igmp ssm-map.....	566
ip igmp static-group .....	568
ip igmp version.....	569
ip interface loopback (overlay gateway).....	570

ip mtu .....	571
ip ospf active .....	572
ip ospf area .....	573
ip ospf auth-change-wait-time .....	574
ip ospf authentication-key .....	576
ip ospf bfd.....	577
ip ospf cost .....	578
ip ospf database-filter .....	579
ip ospf dead-interval .....	581
ip ospf hello-interval .....	583
ip ospf ldp-sync .....	585
ip ospf md5-authentication .....	586
ip ospf mtu-ignore .....	588
ip ospf network .....	589
ip ospf passive .....	591
ip ospf priority .....	592
ip ospf retransmit-interval .....	593
ip ospf transmit-delay .....	594
ip pim dr-priority.....	595
ip pim snooping enable.....	597
ip pim-sparse .....	598
ip pim ttl-threshold.....	599
ip policy route-map.....	600
ip proxy-arp .....	601
ip receive access-group.....	602
ip route.....	604
ip router-id .....	606
ip router isis .....	607
ip vrrp-extended auth-type .....	608
ipv6 access-list .....	610
ipv6 address.....	612
ipv6 dhcp relay address .....	614
ipv6 dns .....	616
ipv6 icmpv6 rate-limiting .....	617
ipv6 mtu .....	618
ipv6 ospf active .....	619
ipv6 ospf area .....	620
ipv6 ospf authentication ipsec .....	621
ipv6 ospf authentication ipsec disable .....	622
ipv6 ospf authentication spi.....	623
ipv6 ospf bfd.....	625
ipv6 ospf cost .....	626
ipv6 ospf dead-interval .....	627
ipv6 ospf hello-interval .....	628
ipv6 ospf hello-jitter .....	630
ipv6 ospf instance .....	631
ipv6 ospf mtu-ignore .....	632
ipv6 ospf network .....	633
ipv6 ospf passive .....	635
ipv6 ospf priority .....	636

ipv6 ospf retransmit-interval .....	637
ipv6 ospf suppress-linklsa .....	638
ipv6 ospf transmit-delay .....	639
ipv6 policy route-map.....	640
ipv6 prefix-list.....	641
ipv6 protocol vrrp .....	643
ipv6 protocol vrrp-extended .....	644
ipv6 receive access-group.....	645
ipv6 route.....	647
ipv6 route next-hop-vrf.....	649
ipv6 route null.....	651
ipv6 router isis .....	653
ipv6 router ospf .....	654
ipv6 vrrp-extended auth-type .....	655
ipv6 vrrp-extended-group .....	656
ipv6 vrrp-group .....	657
ipv6 vrrp-suppress-interface-ra .....	658
isis auth-check.....	659
isis auth-key.....	661
isis auth-mode.....	662
isis bfd.....	663
isis circuit-type.....	664
isis hello-interval.....	665
isis hello-multiplier.....	667
isis hello padding.....	669
isis ipv6 metric.....	670
isis ldp-sync.....	672
isis metric.....	673
isis passive.....	675
isis point-to-point.....	676
isis priority.....	677
isis reverse-metric.....	679
is-type.....	681
iterations.....	683
<b>Commands K - M.....</b>	<b>685</b>
ka-int-count.....	685
ka-interval.....	686
ka-timeout.....	688
key.....	690
key-add-remove-interval.....	691
key-rollover-interval.....	692
keypair.....	693
label-withdrawal-delay .....	694
lACP default-up .....	695
lACP port-priority .....	696
lACP system-priority .....	697
lACP timeout .....	698
lACP-pdu-forward enable.....	700
latch-detection.....	701
ldap-server host .....	703

ldap-server maprole .....	705
ldp.....	706
ldp-enable.....	707
ldp-params.....	708
ldp-sync.....	709
license add .....	711
license eula.....	713
license remove .....	715
line vty exec-timeout .....	717
link-error-disable.....	719
link-fault-signal.....	721
link-oam enable.....	723
link-oam allow-loopback.....	724
link-oam remote-failure.....	725
link-oam remote-loop-back.....	726
lldp profile .....	727
load-sharing.....	728
local-as .....	729
local-switching.....	730
log (OSPFv2).....	731
log (OSPFv3).....	733
log adjacency.....	735
logging auditlog class .....	736
logging raslog console stop.....	737
logging raslog console .....	738
logging syslog-client.....	739
logging syslog-facility local .....	740
logging syslog-server .....	741
log-dampening-debug .....	743
log invalid-lsp-packets.....	744
log-shell.....	745
logical-interface (bridge domain).....	746
loop-detection.....	748
loop-detection shutdown-disable.....	750
loop-detection vlan.....	751
lsp.....	753
lsp-gen-interval.....	754
lsp-interval.....	755
lsp-refresh-interval.....	756
lsr-id .....	757
mac access-list extended .....	758
mac access-list standard .....	760
mac-address withdrawal.....	761
mac-address-table aging-time.....	763
maid-format .....	764
ma-name.....	765
map bridge-domain (overlay gateway).....	767
map dscp.....	768
map vlan .....	770
master-vlan (STP).....	772

match (route map).....	773
match access-group .....	777
match bridge-domain.....	778
match community .....	779
match extcommunity.....	780
match vlan .....	781
maxas-limit .....	782
maximum-paths (BGP).....	783
maximum-paths (IS-IS).....	785
maximum-paths (OSPF).....	786
maximum-paths ebgp ibgp .....	787
max-age .....	789
max-bypasses.....	791
max-bypasses-per-mp.....	793
max-lsp-lifetime.....	795
max-mcache .....	796
max-metric router-lsa .....	797
max-metric router-lsa (OSPFv3).....	799
max-neighbor-reconnect-time.....	801
max-neighbor-recovery-time.....	802
med-missing-as-worst .....	803
measurement-interval.....	804
member bridge-domain (MCT).....	805
member-bridge-domain.....	806
member vlan.....	807
member-vlan (STP).....	809
mep.....	810
message-interval .....	812
metric.....	813
metric-style wide.....	814
metric-type .....	815
mip-policy.....	816
mode gre ip .....	818
mode (LLDP) .....	819
mode (port-group).....	820
monitor session .....	821
mpls-interface.....	822
mpls reoptimize.....	823
mtu.....	824
mtu-enforce.....	825
multipath .....	826
multiplier (LLDP).....	828
multiplier (UDLD).....	829
multi-topology.....	830
<b>Commands N - Q.....</b>	<b>833</b>
name-prefix.....	833
nbr-timeout .....	835
neighbor activate.....	836
neighbor advertisement-interval .....	838
neighbor allowas-in .....	840

neighbor as-override .....	842
neighbor bfd .....	844
neighbor capability as4 .....	846
neighbor capability orf prefixlist.....	848
neighbor default-originate .....	850
neighbor description .....	852
neighbor ebgp-btsh .....	854
neighbor ebgp-multihop .....	856
neighbor enable-peer-as-check.....	857
neighbor encapsulation.....	858
neighbor enforce-first-as .....	860
neighbor filter-list .....	862
neighbor local-as .....	864
neighbor maxas-limit in .....	866
neighbor maximum-prefix .....	868
neighbor next-hop-self .....	870
neighbor next-hop-unchanged.....	872
neighbor password .....	874
neighbor peer-group .....	876
neighbor prefix-list .....	878
neighbor remote-as .....	880
neighbor remove-private-as.....	882
neighbor route-map .....	884
neighbor route-reflector-client .....	886
neighbor send-community .....	887
neighbor shutdown .....	889
neighbor soft-reconfiguration inbound .....	891
neighbor static-network-edge.....	893
neighbor timers .....	894
neighbor unsuppress-map .....	896
neighbor update-source .....	898
neighbor weight .....	900
net.....	902
network .....	903
next-hop-enable-default .....	905
next-hop-mpls.....	906
next-hop-recursion .....	908
node.....	909
nonstop-routing (IS-IS).....	910
nonstop-routing (OSPF).....	911
notification-timer.....	912
ntp authentication-key .....	913
ntp server .....	915
ntp source-ip.....	917
openflow default-behavior send-to-controller .....	918
openflow enable .....	919
openflow-controller.....	921
openflow-mirror destination.....	923
openflow protected-vlans.....	924
openflow ingress-replication group-id-range.....	925

oscmd.....	926
overlay access-group.....	928
overlay access-list type vxlan extended.....	929
overlay access-list type vxlan standard .....	930
overlay-gateway .....	931
overlay-service-policy.....	933
overlay-transit.....	935
partial-spf-interval.....	936
password-attributes .....	938
path.....	941
pdu-rate.....	943
peer.....	944
peer (MCT).....	946
peer-interface.....	947
penalty.....	948
permit ip host.....	949
police cir.....	951
policy-map .....	953
port-channel path-cost .....	955
port-group.....	957
power-off.....	958
power-on.....	960
preempt-mode .....	961
primary-path.....	962
priority .....	964
process-restart.....	966
profile (hardware).....	969
profile (LLDP) .....	970
profile (Telemetry).....	972
profile counters.....	973
profile route-table.....	974
profile tcam.....	976
protocol.....	978
protocol cfm .....	979
protocol link-oam .....	980
protocol lldp .....	981
protocol loop-detection.....	982
protocol spanning-tree .....	983
protocol udld .....	985
protocol vrrp .....	986
protocol vrrp-extended .....	987
prune-wait.....	988
pw-profile.....	989
pw-profile (bridge domain).....	991
python.....	992
qos cos .....	996
qos cos-mutation .....	997
qos cos-traffic-class.....	998
qos cpu slot .....	999
qos dscp-cos .....	1001



qos dscp-mutation .....	1002
qos dscp-traffic-class .....	1003
qos flowcontrol rx.....	1004
qos map cos-mutation .....	1005
qos map cos-traffic-class.....	1007
qos map dscp-cos .....	1009
qos map dscp-mutation .....	1011
qos map dscp-traffic-class .....	1013
qos map traffic-class-cos .....	1015
qos-mpls map dscp-exp.....	1017
qos-mpls map exp-dscp .....	1019
qos-mpls map exp-traffic-class .....	1021
qos-mpls map traffic-class-exp.....	1023
qos-mpls map-apply dscp-exp.....	1025
qos-mpls map-apply exp-dscp.....	1026
qos-mpls map-apply exp-traffic-class.....	1027
qos-mpls map-apply traffic-class-exp.....	1028
qos random-detect traffic-class.....	1029
qos red-profile.....	1030
qos rx-queue cos-threshold .....	1032
qos rx-queue multicast.....	1033
qos rx-queue unicast traffic-class.....	1035
qos service-policy.....	1036
qos traffic-class .....	1037
qos traffic-class-cos.....	1038
qos tx-queue scheduler strict-priority .....	1039
<b>Commands R - Sh.....</b>	<b>1041</b>
radius-server host .....	1041
raslog-duration.....	1043
rd (EVPN VLAN/BD).....	1044
rd auto (EVPN default instance).....	1045
reconnect-time.....	1046
record.....	1047
record-route.....	1048
recovery-time.....	1049
redistribute .....	1050
refresh-reduction.....	1054
region .....	1056
reliable-messaging.....	1057
reload.....	1059
remote-mep .....	1060
rename .....	1061
reoptimize-timer.....	1062
resequence access-list .....	1064
reservable-bandwidth.....	1066
retain route-target all .....	1068
retransmit-interval.....	1069
retries.....	1070
retry-limit.....	1071
retry-time.....	1072

reverse-metric.....	1073
revert-timer.....	1075
revertive global.....	1077
revertive hold-time.....	1079
revision .....	1080
rfc1583-compatibility (OSPF).....	1081
rib-route-limit .....	1082
rmon alarm .....	1084
rmon collection history .....	1086
rmon collection stats .....	1088
rmon event .....	1089
role name .....	1091
root access console.....	1093
root enable.....	1094
router bgp .....	1095
route-map (default system-mode) .....	1096
route-only.....	1098
router-interface.....	1100
router isis .....	1101
router mpls.....	1102
router ospf .....	1103
router pim.....	1104
route-precedence.....	1105
route-target .....	1106
route-target (EVPN default instance).....	1107
route-target (EVPN VLAN/BD).....	1109
rp-address.....	1111
rp-candidate.....	1113
rpf ecmp rebalance.....	1115
rsvp.....	1116
rsvp-flooding-threshold.....	1117
rsvp-periodic-flooding-time.....	1119
rule .....	1120
rx-label-silence-time.....	1122
sample-recording.....	1123
scheduler.....	1125
seq (rules in IPv4 extended ACLs).....	1127
seq (rules in IPv4 standard ACLs).....	1132
seq (rules in IPv6 extended ACLs).....	1135
seq (rules in IPv6 standard ACLs).....	1140
seq (rules in MAC extended ACLs).....	1143
seq (rules in MAC standard ACLs).....	1149
service password-encryption .....	1151
service-policy .....	1152
session.....	1154
set-debug.....	1156
set extcommunity.....	1157
set ip interface null0 .....	1159
set ip next-hop .....	1160
set ipv6 interface null0 .....	1161

set ipv6 next-hop .....	1162
set-overload-bit.....	1163
sflow enable (global version).....	1165
sflow collector .....	1166
sflow polling-interval (global version).....	1168
sflow sample-rate (global version).....	1169
sflow source-interface.....	1170
shutdown (STP).....	1172
shutdown (link-oam) .....	1173
shutdown-time.....	1174
<b>Show A through Show I.....</b>	<b>1175</b>
show access-list.....	1175
show access-list-log buffer .....	1178
show access-list-log buffer config.....	1180
show access-list overlay transit.....	1181
show access-list overlay type vxlan acl-name .....	1182
show arp .....	1183
show arp access-list.....	1185
show bfd.....	1186
show bfd neighbors application.....	1188
show bfd neighbors dest-ip.....	1190
show bfd neighbors details.....	1192
show bfd neighbors interface.....	1194
show bfd neighbors.....	1196
show bgp evpn l2route.....	1198
show bgp evpn neighbors .....	1201
show bgp evpn neighbors advertised-routes.....	1202
show bgp evpn neighbors routes.....	1205
show bgp evpn routes.....	1207
show bgp evpn routes best.....	1208
show bgp evpn routes detail.....	1210
show bgp evpn routes local.....	1212
show bgp evpn routes next-hop.....	1215
show bgp evpn routes no-best.....	1216
show bgp evpn routes not-installed-best.....	1218
show bgp evpn routes rd.....	1219
show bgp evpn routes rd type.....	1221
show bgp evpn routes unreachable.....	1225
show bgp evpn summary.....	1226
show bridge-domain.....	1227
show capabilities.....	1232
show cert-util syslogca.....	1234
show cfm.....	1235
show cfm y1731 action-profile .....	1237
show cfm y1731 delay-measurement .....	1238
show cfm y1731 synthetic-loss-measurement .....	1240
show cfm y1731 test-profile .....	1242
show chassis .....	1243
show cipherset .....	1246
show cli .....	1247

show clock .....	1248
show cluster.....	1249
show copy-support status .....	1252
show cpu-interface.....	1253
show crypto ca .....	1254
show crypto key.....	1256
show debug arp packet.....	1257
show debug dhcp packet .....	1259
show debug dhcp packet buffer .....	1260
show debug ip bgp all .....	1263
show debug ip igmp .....	1264
show debug ipv6 mld.....	1265
show debug ipv6 packet.....	1266
show debug lacp .....	1268
show debug lldp .....	1269
show debug spanning-tree .....	1270
show debug vrrp .....	1271
show defaults threshold .....	1272
show dot1x .....	1275
show dpod .....	1278
show environment fan .....	1280
show environment history .....	1281
show environment power .....	1283
show environment sensor .....	1284
show environment temp detail .....	1285
show event-handler activations.....	1287
show file .....	1289
show firmwaredownloadhistory .....	1291
show firmwaredownloadstatus .....	1292
show ha.....	1294
show hardware profile.....	1295
show hardware port-group.....	1298
show history .....	1299
show http server status.....	1300
show image-snapshot.....	1301
show interface .....	1302
show interface stats brief.....	1307
show interface stats detail.....	1309
show interface stats utilization-watermark.....	1311
show interface status.....	1313
show inventory .....	1314
show ip arp inspection.....	1316
show ip arp inspection interfaces.....	1318
show ip bgp.....	1320
show ip bgp attribute-entries .....	1321
show ip bgp dampened-paths .....	1322
show ip bgp filtered-routes .....	1323
show ip bgp flap-statistics .....	1324
show ip bgp neighbors .....	1326
show ip bgp neighbors advertised-routes .....	1328

show ip bgp neighbors flap-statistics .....	1329
show ip bgp neighbors last-packet-with-error.....	1330
show ip bgp neighbors received .....	1332
show ip bgp neighbors received-routes .....	1333
show ip bgp neighbors rib-out-routes.....	1334
show ip bgp neighbors routes .....	1335
show ip bgp neighbors routes-summary .....	1336
show ip bgp peer-group .....	1337
show ip bgp routes .....	1338
show ip bgp routes community .....	1341
show ip bgp summary .....	1342
show ip dhcp relay address interface .....	1343
show ip dhcp relay gateway.....	1344
show ip dhcp relay statistics .....	1345
show ip igmp groups .....	1346
show ip igmp interface .....	1347
show ip igmp snooping .....	1348
show ip igmp ssm-map.....	1349
show ip igmp statistics interface .....	1350
show ip igmp statistics vlan.....	1351
show ip interface .....	1352
show ip multicast snooping.....	1354
show ip ospf .....	1355
show ip ospf area .....	1356
show ip ospf border-routers .....	1358
show ip ospf config .....	1359
show ip ospf database .....	1360
show ip ospf filtered-lsa area .....	1363
show ip ospf interface .....	1364
show ip ospf neighbor .....	1366
show ip ospf redistribute route .....	1367
show ip ospf routes .....	1368
show ip ospf summary .....	1370
show ip ospf traffic .....	1371
show ip ospf virtual link .....	1373
show ip ospf virtual neighbor .....	1374
show ip pim bsr.....	1375
show ip pim interface.....	1378
show ip pim mcache .....	1379
show ip pim neighbor.....	1380
show ip pim rp-candidate.....	1382
show ip pim rp-hash.....	1384
show ip pim rp-map.....	1385
show ip pim rp-set.....	1386
show ip pim rpf.....	1388
show ip pim traffic.....	1389
show ip pim bsr VRF.....	1391
show ip pim interface VRF.....	1394
show ip pim neighbor VRF.....	1395
show ip pim rp-candidate VRF.....	1397

show ip pim rpf VRF.....	1399
show ip pim rp-hash VRF.....	1400
show ip pim rp-map VRF.....	1401
show ip pim rp-set VRF.....	1402
show ip pim traffic VRF.....	1404
show ip route .....	1406
show ipv6 bgp.....	1410
show ipv6 bgp attribute-entries .....	1411
show ipv6 bgp dampened-paths .....	1412
show ipv6 bgp filtered-routes .....	1413
show ipv6 bgp flap-statistics .....	1414
show ipv6 bgp neighbors .....	1416
show ipv6 bgp neighbors advertised-routes .....	1418
show ipv6 bgp neighbors flap-statistics .....	1419
show ipv6 bgp neighbors last-packet-with-error.....	1420
show ipv6 bgp neighbors received .....	1422
show ipv6 bgp neighbors received-routes .....	1423
show ipv6 bgp neighbors rib-out-routes.....	1424
show ipv6 bgp neighbors routes.....	1425
show ipv6 bgp neighbors routes-summary.....	1426
show ipv6 bgp peer-group .....	1429
show ipv6 bgp routes .....	1430
show ipv6 bgp routes community .....	1433
show ipv6 bgp summary .....	1434
show ipv6 counters interface .....	1435
show ipv6 dhcp relay address interface .....	1436
show ipv6 dhcp relay statistics .....	1437
show ipv6 interface .....	1438
show ipv6 nd .....	1440
show ipv6 neighbor.....	1442
show ipv6 ospf .....	1443
show ipv6 ospf area .....	1444
show ipv6 ospf database .....	1445
show ipv6 ospf interface .....	1448
show ipv6 ospf memory .....	1449
show ipv6 ospf neighbor .....	1450
show ipv6 ospf redistribute route .....	1452
show ipv6 ospf routes .....	1453
show ipv6 ospf spf .....	1454
show ipv6 ospf summary .....	1455
show ipv6 ospf virtual-links .....	1456
show ipv6 ospf virtual-neighbor .....	1457
show ipv6 prefix-list.....	1458
show ipv6 route .....	1459
show ipv6 static route .....	1461
show ipv6 vrrp .....	1462
show isis.....	1467
show isis config.....	1471
show isis counts.....	1472
show isis database .....	1475

show isis hostname.....	1478
show isis interface .....	1479
show isis neighbors .....	1485
show isis routes .....	1488
show isis spf-log .....	1490
show isis traffic .....	1493
<b>Show J through Show Z.....</b>	<b>1495</b>
show lacp .....	1495
show latch-detection.....	1496
show license .....	1498
show link-oam info.....	1500
show link-oam info detail.....	1501
show link-oam statistics.....	1503
show link-oam statistics detail.....	1504
show lldp interface .....	1506
show lldp neighbors.....	1508
show lldp statistics.....	1510
show loop-detection.....	1511
show mac-address-table.....	1514
show media tunable-optic-sfpp.....	1517
show monitor .....	1519
show mpls autobw-template.....	1520
show mpls autobw-threshold-table.....	1521
show mpls bypass-lsp.....	1522
show mpls lsp.....	1524
show mpls policy.....	1531
show mpls rsvp.....	1532
show mpls rsvp interface.....	1534
show mpls rsvp session.....	1537
show mpls statistics.....	1545
show mpls te database.....	1548
show netconf.....	1550
show netconf capabilities.....	1551
show notification stream.....	1552
show ntp status.....	1553
show openflow .....	1554
show openflow controller.....	1557
show openflow flow .....	1558
show openflow group .....	1560
show openflow interface .....	1562
show openflow meter .....	1563
show openflow queues .....	1565
show openflow resources .....	1567
show overlay-gateway .....	1569
show policy-map .....	1571
show port port-channel ethernet .....	1573
show port-channel .....	1574
show port-security .....	1576
show process cpu .....	1578
show process info .....	1580

show process memory .....	1582
show qos cpu cfg.....	1584
show qos cpu info.....	1587
show qos flowcontrol interface.....	1588
show qos interface all.....	1590
show qos interface ethernet .....	1594
show qos interface port-channel.....	1597
show qos interface ve.....	1604
show qos maps cos-traffic-class .....	1606
show qos maps dscp-cos .....	1607
show qos maps dscp-mutation .....	1608
show qos maps dscp-traffic-class .....	1609
show qos maps traffic-class-cos.....	1610
show qos-mpls maps dscp-exp.....	1611
show qos-mpls maps exp-dscp.....	1612
show qos-mpls maps exp-traffic-class .....	1613
show qos-mpls maps traffic-class-exp.....	1614
show route-map .....	1615
show rmon .....	1617
show rmon history .....	1619
show run router mpls cspf-group.....	1620
show running-config .....	1621
show running-config aaa .....	1622
show running-config aaa accounting .....	1624
show running-config arp.....	1625
show running-config dpod .....	1627
show running-config event-handler.....	1628
show running-config ip access-list .....	1630
show running-config ipv6 .....	1631
show running-config ipv6 access-list .....	1633
show running-config ldap-server .....	1634
show running-config mac access-list.....	1635
show running-config password-attributes .....	1636
show running-config radius-server .....	1638
show running-config rmon .....	1639
show running-config role .....	1640
show running-config rule .....	1641
show running-config ssh .....	1643
show running-config ssh server .....	1644
show running-config ssh server key-exchange .....	1645
show running-config username .....	1646
show sflow .....	1648
show slots.....	1649
show span path session .....	1651
show spanning-tree .....	1652
show ssh client status .....	1654
show ssh server status .....	1655
show startup-config .....	1656
show startup-database .....	1657
show statistics access-list .....	1658



show statistics access-list overlay type vxlan .....	1660
show statistics bridge-domain.....	1661
show statistics vlan.....	1663
show statistics vpn .....	1665
show storm-control .....	1666
show support .....	1668
show system monitor tm.....	1669
show telnet server status .....	1670
show threshold monitor .....	1671
show tm voq-stat ingress-device all discards.....	1673
show tm voq-stat ingress-device all egress-port ethernet .....	1675
show tm voq-stat ingress-device all max-buffer-util.....	1677
show tm voq-stat ingress-device all max-queue-depth.....	1678
show tm voq-stat ingress-device ethernet.....	1680
show tm voq-stat slot.....	1682
show topology-group.....	1685
show tunnel.....	1687
show tunnel statistics.....	1688
show udd .....	1689
show udd interface .....	1690
show udd statistics .....	1692
show users .....	1693
show version .....	1694
show vlan brief.....	1696
show vrf .....	1698
show vrrp.....	1700
<b>Commands Shu - Z.....</b>	<b>1705</b>
shutdown (interface).....	1705
site .....	1706
snmp-server community.....	1708
snmp-server contact.....	1709
snmp-server context.....	1711
snmp-server enable trap.....	1713
snmp-server engineid local .....	1714
snmp-server group .....	1715
snmp-server host .....	1717
snmp-server location.....	1719
snmp-server mib community-map.....	1721
snmp-server sys-descr.....	1723
snmp-server user .....	1725
snmp-server v3host .....	1728
snmp-server view .....	1730
soft-preemption.....	1732
soft-preemption cleanup-timer.....	1733
source .....	1734
source-interface.....	1736
spanning-tree autoedge .....	1738
spanning-tree bpdu-mac .....	1739
spanning-tree cost .....	1740
spanning-tree edgeport .....	1741

spanning-tree guard root .....	1743
spanning-tree link-type .....	1744
spanning-tree portfast .....	1745
spanning-tree priority .....	1747
spanning-tree restricted-role .....	1748
spanning-tree restricted-tcn .....	1749
spanning-tree shutdown .....	1750
speed (Ethernet).....	1751
spf-interval.....	1753
spt-threshold.....	1755
ssh .....	1756
ssh client cipher.....	1759
ssh client cipher non-cbc.....	1760
ssh client key-exchange .....	1761
ssh client mac.....	1763
ssh server cipher.....	1764
ssh server cipher non-cbc.....	1765
ssh server key.....	1766
ssh server key-exchange .....	1768
ssh server mac.....	1770
ssh server max-sessions.....	1771
ssh server rekey-interval .....	1773
ssh server shutdown .....	1774
ssh server standby enable.....	1775
ssm-enable.....	1776
start (CFM).....	1778
start .....	1779
start-shell.....	1781
static-network .....	1783
statistics .....	1784
statistics (bridge domain).....	1785
statistics (VLAN).....	1786
stop (CFM).....	1787
stop .....	1789
storm-control ingress .....	1791
subnet.....	1793
summary-address (IS-IS).....	1794
summary-address (OSPFv2).....	1796
summary-address (OSPFv3).....	1798
summary-prefix.....	1800
support autoupload-param.....	1802
switch-attributes.....	1803
switchport .....	1805
switchport access .....	1806
switchport mode .....	1808
switchport mode trunk-no-default-native .....	1809
switchport port-security .....	1810
switchport port-security mac-address .....	1811
switchport port-security max .....	1812
switchport port-security shutdown-time .....	1813

switchport port-security sticky .....	1814
switchport port-security violation .....	1815
switchport trunk allowed .....	1816
switchport trunk native-vlan-untagged .....	1818
switchport trunk native-vlan-xtagged .....	1819
switchport trunk tag native-vlan .....	1821
sync-interval.....	1822
sysmon fe-acces-check .....	1824
sysmon sfm-walk .....	1826
sysmon link-crc-monitoring.....	1828
system-description .....	1829
system-monitor tm.....	1830
system-monitor-mail .....	1831
system-monitoring power alert state removed action raslog.....	1833
system-name .....	1835
system power-cycle-db-shutdown.....	1836
table-map .....	1837
tacacs-server .....	1839
telemetry client-cert.....	1842
telemetry collector.....	1843
telemetry profile.....	1844
telemetry server.....	1846
telnet.....	1847
telnet server.....	1849
terminal.....	1851
test-profile .....	1853
threshold.....	1854
threshold (ETH-SLM) .....	1856
threshold (ETH-DM) .....	1858
threshold-monitor cpu .....	1860
threshold-monitor memory .....	1862
threshold-monitor sfp .....	1864
tie-breaking.....	1867
timeout.....	1869
timeout .....	1870
timeout (link-oam).....	1871
timers (BGP).....	1872
timers (OSPFv2).....	1874
timers (OSPFv3).....	1876
tlv-type.....	1878
to.....	1879
topology-group.....	1880
tpvm.....	1881
tpvmadm.....	1887
traceroute .....	1893
track (VRRP).....	1895
traffic-engineering.....	1897
traffic-engineering (LSP).....	1899
transit-session-accounting.....	1901
trigger.....	1902

trigger-function.....	1904
trigger-mode.....	1906
tll.....	1908
tunable-optics.....	1909
tx-frame-count .....	1913
tx-interval .....	1914
tx-label-silence-timer.....	1915
type .....	1916
type layer2-extension .....	1917
udld enable .....	1918
underflow-limit.....	1919
unlock username .....	1921
update-time .....	1922
usb .....	1924
usb dir .....	1925
usb remove .....	1926
use-v2-checksum.....	1927
user (alias configuration).....	1928
username .....	1929
vc-id.....	1931
vc-mode.....	1932
virtual-ip .....	1934
virtual-mac .....	1936
vlan.....	1937
vlan (EVPN default instance).....	1938
vpn-statistics.....	1940
vrf .....	1941
vrrp-acceptmode-disable.....	1942
vrrp-extended-group .....	1943
vrrp-group .....	1944
vtep-discovery .....	1946
write erase.....	1947
y1731 .....	1948

# Preface

---

- Document conventions..... 29
- Extreme resources..... 30
- Document feedback..... 30
- Contacting Extreme Technical Support..... 31

## Document conventions

The document conventions describe text formatting conventions, command syntax conventions, and important notice formats used in Extreme technical documentation.

## Notes, cautions, and warnings

Notes, cautions, and warning statements may be used in this document. They are listed in the order of increasing severity of potential hazards.

### NOTE

A Note provides a tip, guidance, or advice, emphasizes important information, or provides a reference to related information.

### ATTENTION

An Attention statement indicates a stronger note, for example, to alert you when traffic might be interrupted or the device might reboot.



### CAUTION

A Caution statement alerts you to situations that can be potentially hazardous to you or cause damage to hardware, firmware, software, or data.



### DANGER

A Danger statement indicates conditions or situations that can be potentially lethal or extremely hazardous to you. Safety labels are also attached directly to products to warn of these conditions or situations.

## Text formatting conventions

Text formatting conventions such as boldface, italic, or Courier font may be used to highlight specific words or phrases.

Format	Description
<b>bold text</b>	Identifies command names. Identifies keywords and operands. Identifies the names of GUI elements.
<i>italic text</i>	Identifies text to enter in the GUI. Identifies emphasis. Identifies variables.
Courier font	Identifies document titles. Identifies CLI output.

Format	Description
	Identifies command syntax examples.

## Command syntax conventions

Bold and italic text identify command syntax components. Delimiters and operators define groupings of parameters and their logical relationships.

Convention	Description
<b>bold text</b>	Identifies command names, keywords, and command options.
<i>italic text</i>	Identifies a variable.
[ ]	Syntax components displayed within square brackets are optional.  Default responses to system prompts are enclosed in square brackets.
{ x   y   z }	A choice of required parameters is enclosed in curly brackets separated by vertical bars. You must select one of the options.
x   y	A vertical bar separates mutually exclusive elements.
< >	Nonprinting characters, for example, passwords, are enclosed in angle brackets.
...	Repeat the previous element, for example, <i>member[member...]</i> .
\	Indicates a "soft" line break in command examples. If a backslash separates two lines of a command input, enter the entire command at the prompt without the backslash.

## Extreme resources

Visit the Extreme website to locate related documentation for your product and additional Extreme resources.

White papers, data sheets, and the most recent versions of Extreme software and hardware manuals are available at [www.extremenetworks.com](http://www.extremenetworks.com). Product documentation for all supported releases is available to registered users at [www.extremenetworks.com/support/documentation](http://www.extremenetworks.com/support/documentation).

## Document feedback

Quality is our first concern at Extreme, and we have made every effort to ensure the accuracy and completeness of this document. However, if you find an error or an omission, or you think that a topic needs further development, we want to hear from you.

You can provide feedback in two ways:

- Use our short online feedback form at <http://www.extremenetworks.com/documentation-feedback-pdf/>
- Email us at [internalinfodev@extremenetworks.com](mailto:internalinfodev@extremenetworks.com)

Provide the publication title, part number, and as much detail as possible, including the topic heading and page number if applicable, as well as your suggestions for improvement.

# Contacting Extreme Technical Support

As an Extreme customer, you can contact Extreme Technical Support using one of the following methods: 24x7 online or by telephone. OEM customers should contact their OEM/solution provider.

If you require assistance, contact Extreme Networks using one of the following methods:

- [GTAC \(Global Technical Assistance Center\)](#) for immediate support
  - Phone: 1-800-998-2408 (toll-free in U.S. and Canada) or +1 408-579-2826. For the support phone number in your country, visit: [www.extremenetworks.com/support/contact](http://www.extremenetworks.com/support/contact).
  - Email: [support@extremenetworks.com](mailto:support@extremenetworks.com). To expedite your message, enter the product name or model number in the subject line.
- [GTAC Knowledge](#) - Get on-demand and tested resolutions from the GTAC Knowledgebase, or create a help case if you need more guidance.
- [The Hub](#) - A forum for Extreme customers to connect with one another, get questions answered, share ideas and feedback, and get problems solved. This community is monitored by Extreme Networks employees, but is not intended to replace specific guidance from GTAC.
- [Support Portal](#) - Manage cases, downloads, service contracts, product licensing, and training and certifications.

Before contacting Extreme Networks for technical support, have the following information ready:

- Your Extreme Networks service contract number and/or serial numbers for all involved Extreme Networks products
- A description of the failure
- A description of any action(s) already taken to resolve the problem
- A description of your network environment (such as layout, cable type, other relevant environmental information)
- Network load at the time of trouble (if known)
- The device history (for example, if you have returned the device before, or if this is a recurring problem)
- Any related RMA (Return Material Authorization) numbers





# About This Document

- Supported hardware and software.....33
- What's new in this document.....33

## Supported hardware and software

In those instances in which procedures or parts of procedures documented here apply to some devices but not to others, this guide identifies exactly which devices are supported and which are not.

Although many different software and hardware configurations are tested and supported by Extreme Networks, Inc. for SLX-OS Release 17r.1.01, documenting all possible configurations and scenarios is beyond the scope of this document.

The following hardware platforms are supported by this release:

- ExtremeRouting SLX 9850-4
- ExtremeRouting SLX 9850-8
- ExtremeSwitching SLX 9540

## Interface module capabilities

The following table lists the supported capabilities for the following SLX 9850 interface modules:

- BR-SLX9850-10Gx72S-M
- BR-SLX9850-100Gx36CQ-M
- BR-SLX9850-10Gx72S-D
- BR-SLX9850-100Gx36CQ-D

**TABLE 1** SLX 9850 interface modules capabilities

Capability	Modular interface module
MPLS	Yes
Packet buffer memory per interface module	12GB (BR-SLX9850-10Gx72S-M) 36GB (BR-SLX9850-100Gx36CQ-M) 8GB (BR-SLX9850-10Gx72S-D) 24GB (BR-SLX9850-100Gx36CQ-D)

## What's new in this document

Information has been added or updated to reflect new SLX-OS features or enhancements to existing SLX-OS features for the SLX 9850 and SLX 9540 devices.

### NOTE

On October 30, 2017, Extreme Networks, Inc. acquired the data center networking business from Brocade Communications Systems, Inc. This document has been updated to remove or replace references to Brocade Communications, Inc. with Extreme Networks, Inc., as appropriate.

For commands introduced since Release 16r.1.00, a history table listed with each command provides information about modifications to the command.

## New commands

The following commands have been added (new for this release).

- **description (BD)**
- **mac-address withdrawal**
- **overlay-service-policy**
- **route-target**

## Modified commands

The following commands have been modified in this release.

- **overlay-gateway**
- **policer cir**

# Commands A - B

---

## aaa accounting

Enables accounting for command or login information; information is forwarded to the accounting server.

### Syntax

```
aaa accounting { commands | exec } default start-stop [ none | radius | tacacs+ ]
```

```
no aaa accounting { commands | exec } default start-stop [ none | radius | tacacs+ ]
```

### Command Default

Accounting is disabled.

### Parameters

#### **commands**

Causes command accounting.

#### **exec**

Causes login accounting.

#### **default**

Causes the sending of logged information to the default server.

#### **start-stop**

Causes the sending of a "start" accounting notice at the beginning of a process and a "stop" accounting notice at the end of a process. The "start" accounting record is sent in the background. The requested user process begins regardless of whether the "start" accounting notice was received by the accounting server.

#### **none**

Disables accounting services.

#### **radius**

Specifies using the RADIUS server for accounting.

#### **tacacs+**

Specifies using the TACACS+ server for accounting.

### Modes

Global configuration mode

### Usage Guidelines

Before enabling login (EXEC) or command accounting for RADIUS, at least one RADIUS server must be configured on the device.

In RADIUS command accounting:

- All command accounting packets are sent to the initial RADIUS server configured (rather than any RADIUS server used for authentication). When the initial server fails, packets are sent to the next configured server in round-robin fashion.
- Commands with a partial timestamp are not accounted.

The following configuration commands are not accounted:

- **abort**
- **end**
- **exit**
- **help**
- **no vlan**
- **service**
- **top**

The following operational commands are not accounted:

- **cipherset**
- **copy**
- **delete**
- **dir**
- **dot1x**
- **exit**
- **help**
- **history**
- **logout**
- **oscmd**
- **ping**
- **rename**
- **reload**
- **resequence**
- **send**
- **show cipherset**
- **show cli**
- **show file**
- **show history**
- **show netconf-state**
- **show parser dump**
- **show startup-config**
- **ssh**
- **telnet**
- **traceroute**

- **quit**
- **help**

The **no** form of the command disables accounting. You can also disable accounting by using the **aaa accounting** command specifying the **none** option.

## Examples

The following example configures command accounting, with the CLI information being forwarded to the TACACS+ server.

```
device(config)# aaa accounting commands default start-stop tacacs+
```

The following example configures command accounting, with the CLI information being forwarded to the RADIUS server.

```
device(config)# aaa accounting commands default start-stop radius
```

The following example disables login accounting by specifying the **none** option; command accounting (when also configured) remains active.

```
device(config)# aaa accounting exec default start-stop none
```

The following example disables login accounting by using the **no aaa accounting** command; command accounting (when also configured) remains active.

```
device(config)# no aaa accounting exec default start-stop
```

## History

Release version	Command history
16r.1.00	This command was introduced.
17r.1.00	This command was modified to add support for RADIUS login (EXEC) and command accounting.

# aaa authentication

Configures the AAA login sequence.

## Syntax

```
aaa authentication login { default | ldap | local }  
aaa authentication login { radius | tacacs+ } { local | local-auth-failback }  
no aaa authentication login
```

## Command Default

The default server is Local.

## Parameters

### login

Specifies the type of server that will be used for authentication, authorization, and accounting (AAA) on the device. The local server is the default. Specify one of the following options:

#### default

Specifies the default mode (local server). Authenticates the user against the local database only. If the password does not match or the user is not defined, the login fails.

#### ldap

Specifies the Lightweight Directory Access Protocol (LDAP) servers.

#### local

Specifies to use the local device database if prior authentication methods are inactive.

#### radius

Specifies the RADIUS servers.

#### tacacs+

Specifies the TACACS+ servers.

#### local

Specifies to use the local device database if prior authentication methods are inactive.

#### local-auth-failback

Specifies to use the local device database if prior authentication methods are not active or if authentication fails.

## Modes

Global configuration mode

## Usage Guidelines

This command selects the order of authentication sources to be used for user authentication during the login process. Two sources are supported: primary and secondary. The secondary source of authentication is optional and will be used if the primary source fails or is not available.

The authentication mode can only be set and cannot be added or deleted. For example, to change a configuration from "radius local" to radius only, execute the **no aaa authentication login** command to resets the configuration to the default mode, and then reconfigure the AAA mode with the desired setting.

In a configuration with primary and secondary sources of authentication, the primary mode cannot be modified alone. For example, you cannot change from "radius local" or "radius local-auth-fallback" to "tacacs+ local" or "tacacs+ local-auth-fallback" respectively. First remove the existing configuration and then configure it to the required configuration.

## Examples

To change the AAA server to TACACS+ using the local device database as a secondary source of authentication:

```
device(config)# aaa authentication login tacacs+ local
Broadcast message from root (pts/0) Tue Apr  5 16:34:12 2011...
```

To change the AAA server from TACACS+ and local to TACACS+ only (no secondary source):

```
device(config)# no aaa authentication login tacacs+ local
device(config)# aaa authentication login tacacs+
device(config)# do show running-config aaa
aaa authentication login tacacs+
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# acl-mirror

Defines a destination port or port-channel for ACL-based mirroring of a physical interface.

## Syntax

```
acl-mirror source ethernet slot / port destination { ethernet slot / port | port-channel index }
no acl-mirror source ethernet slot / port destination { ethernet slot / port | port-channel index }
```

## Command Default

No ACL mirror is defined.

## Parameters

### source

Specifies the interface for which you are defining a mirror.

### ethernet

Specifies a physical Ethernet interface.

#### slot

Specifies a valid slot number.

#### port

Specifies a valid port number.

### destination

Specifies the physical interface or port-channel mirror.

### ethernet

Specifies a physical Ethernet interface.

#### slot

Specifies a valid slot number.

#### port

Specifies a valid port number.

### port-channel index

Specifies a port-channel interface.

## Modes

Global configuration mode

## Usage Guidelines

ACL mirroring applies to extended-ACL rules that include the **mirror** keyword.

ACL mirroring is supported only for ACLs applied to incoming traffic.



Although in an extended-ACL rule you can specify **mirror**, **log**, and **copy-sflow**, only one of the three is processed, as follows:

- In a permit rule, the order of precedence is **mirror > copy-sflow > log**.
- In a deny or hard-drop rule, the order of precedence is **log > copy-sflow > mirror**.

Only one destination mirror port is supported per source port.

Only one destination port is supported per chip.

To cancel an ACL mirroring destination, use the **no** form of this command.

## Examples

The following example defines a physical port as mirror.

```
device# configure
device(config)# acl-mirror source ethernet 2/1 destination ethernet 3/2
```

The following example defines a port-channel as mirror.

```
device# configure
device(config)# acl-mirror source ethernet 3/1 destination port-channel 2
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# acl-policy

Accesses the ACL policy configuration mode, from which you can change the default settings regarding conflicting and duplicate ACL rules.

## Syntax

```
acl-policy
```

## Modes

Global configuration mode

## Usage Guidelines

To return to global configuration mode, enter the **exit** command.

## Examples

The following example accesses the ACL policy configuration mode and then disables the default restriction on duplicate rules within ACLs.

```
device# configure terminal
device(config)# acl-policy
device(config-acl-policy)# allow-duplicate-rules
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# action-profile

Creates an action profile.

## Syntax

**action-profile** *action-profile-name*

**no action-profile**

## Parameters:

*action-profile-name*

Specifies the action profile name. An action profile can be up to 32 characters.

## Modes

Y1731 configuration mode

## Usage Guidelines

Use the **no** form of the command to delete the corresponding configured action profile also its association with source and remote MEP pair.

## Examples

This example shows how to create an action profile.

```
device# configure terminal
device (config-cfm)# y1731
device(config-cfm-y1731)# action-profile a1
device(config-cfm-y1731-action-profile-a1)# event ccm-up actions all
```

## History

Release version	Command history
17r.1.01	This command was introduced.

# action python-script

Specifies a Python file that runs when a trigger condition occurs.

## Syntax

**action python-script** *file-name*

**no action python-script** *file-name*

## Parameters

*file-name*

Specifies a Python script file-name. Valid values range from 4 through 32 characters (including the **.py** extension). The first character must be alphabetic.

## Modes

Event-handler configuration mode

## Usage Guidelines

You can assign only one action to a given event-handler profile.

You can also specify the Python file as part of the **event-handler** command.

To change the file assigned to a profile, you do not need to enter the **no** form of this command. You only need to enter **action python-script file-name**, specifying the new file name.

Running this command copies the Python script file from the `flash://` directory to the database. After specifying a file for all relevant event-handler profiles, you can delete it from the `flash://` directory.

If the event-handler for which you are modifying this command is active on the device, the changes take effect with no need to de-activate and re-activate the event-handler.

A Python event-handler script runs only if all of the following occur:

- Using the **copy** command, copy the Python file to the `flash://` location on the device.
- Using the **event-handler** command, create an event-handler profile.
- In configuration mode for that profile:
  - Using the **trigger** command, create one or more triggers.
  - Using the **action** command, specify the Python script that will be triggered.
- Using the **event-handler activate** command, activate an instance of the event handler.
- The trigger event occurs.

If an event-handler profile is not activated, the **no** form of this command deletes its action.

## Examples

The following example specifies Python files for two event-handler profiles.

```
device# configure terminal
device(config)# event-handler eventHandler1
device(config-event-handler-eventHandler1)# action python-script example.py
device(config-event-handler-eventHandler1)# event-handler eventHandler2
device(config-event-handler-eventHandler2)# action python-script example2.py
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# action-timeout

For an implementation of an event-handler profile, specifies the maximum number of minutes to wait for an action-script to complete execution. If the action-timeout expires, then script execution ends.

## Syntax

`action-timeout minutes`

`no action-timeout`

## Command Default

No action timeout is defined.

## Parameters

*minutes*

Specifies the number of minutes to wait for an action-script to complete execution. If you specify "0", no timeout is set. Valid timeout values are any positive integer.

## Modes

Event-handler activation mode

## Usage Guidelines

To restore the default setting of no timeout, enter the **no** form of this command.

## Examples

The following example specifies an action timeout of 30 minutes.

```
device# configure terminal
device(config)# event-handler activate eventHandler1
device(config-activate-eventHandler1)# action-timeout 30
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# activate (Telemetry collector)

Activates the Telemetry data stream to the collector.

## Syntax

**activate**  
**no activate**

## Command Default

The collector is deactivated.

## Modes

Telemetry streaming mode

## Usage Guidelines

Use the **no activate** command to disable streaming to the collector server.

Activates the collector, which in turn begins streaming related telemetry information to the collector server.

## Examples

Typical command execution.

```
device# configure terminal
device(config)# telemetry server
device(config-telemetry-server)# activate
device(config-telemetry-streaming)# activate
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# activate (Telemetry server)

Activates the Telemetry server.

## Syntax

**activate**  
**no activate**

## Command Default

The Telemetry server is deactivated.

## Modes

Telemetry configuration mode

## Usage Guidelines

Use the **no activate** command to disable the server.

This command activates the Telemetry server so that the data stream is collected.

## Examples

Typical command execution.

```
device# configure terminal
device(config)# telemetry server
device(config-telemetry-server)# activate
device(config-telemetry-streaming)#
```

## History

Release version	Command history
17r.1.00	This command was introduced.



# activate (VXLAN overlay gateway)

Activates a VXLAN overlay gateway instance.

## Syntax

**activate**  
**no activate**

## Command Default

By default, a gateway is not activated during initial configuration.

## Modes

Overlay gateway configuration mode

## Usage Guidelines

It is recommended that you configure all gateway parameters before activating the gateway. This operation enables all tunnels that are associated with this gateway.

The following conditions that must be in place before you can execute the **activate** command:

- Loopback interfaces must be configured on all gateways. Refer to the **interface loopback** command,
- The IP address of the VXLAN gateway must be configured. Refer to the **ip interface** command.

Use the **no activate** command in VXLAN overlay gateway configuration mode to deactivate the gateway. All associated tunnels are also deactivated.

## Examples

The following example activates a VXLAN gateway named gateway1. The gateway was previously configured by means of the **overlay-gateway** command:

```
device# configure terminal
device(config)# overlay-gateway gateway1
device(config-overlay-gw-gateway1)# activate
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# adaptive

Bypass LSPs can be made adaptive using the **adaptive** command. Bypass LSPs are non-adaptive by default. The user can modify the adaptive bypass LSPs adaptive-parameters without disabling the LSP. If the LSP is UP, then modifying an adaptive parameter, like exclude-interface or bandwidth, leads to the creation of a new instance of the bypass LSP. Adaptiveness can be manually enabled by using the **adaptive** command and can be disabled by **no** form of the same command. Use the **adaptive** to set the adaptive option for the dynamic bypass LSPs to be created for the MPLS protected interface.

## Syntax

```
adaptive record [ disable | enable ]
adaptive [ disable | enable ] | record [ disable | enable ]
```

## Command Default

By default, LSPs are not adaptive.

By default, dynamic bypass LSPs are adaptive.

## Parameters

**disable**  
Disables the **adaptive** command.

**enable**  
Enables the **adaptive** command.

**record**  
Specifies RSVP session route recording.

## Modes

MPLS LSP configuration mode (config-router-mpls-lsp-lsp\_name).

MPLS router MPLS interface dynamic bypass configuration mode (config-router-mpls-if-ethernet-slot/port -dynamic-bypass)

## Examples

The following example configures an LSP named *to20* as an adaptive LSP.

```
device# configure
device(config)# router mpls
device(config-router-mpls)# lsp to20
device(config-router-mpls-lsp-to20)# adaptive
```

The following example enables the adaptive command for dynamic bypass MPLS Ethernet interface *2/8*.

```
device# configure
device(config)# router mpls
device(config-router-mpls)# mpls-interface ethernet 2/8
device(config-router-mpls-if-ethernet-2/8-dynamic-bypass)# adaptive enable
```

## History

Release version	Command history
16r.1.00	This command was introduced.
17r.1.00	This command was modified to include dynamic bypass information.

# address-family l2vpn evpn (BGP)

Enables the L2VPN address family configuration mode to configure a variety of BGP EVPN options.

## Syntax

**address-family l2vpn evpn**

**no address-family l2vpn evpn**

## Command Default

Disabled.

## Modes

BGP configuration mode

## Usage Guidelines

Use this command in BGP configuration mode to enter BGP address-family L2VPN EVPN configuration mode. The L2VPN EVPN configuration mode supports the EVPN Subsequent Address Family Identifier (SAFI), an address qualifier that provides additional information about the Network Layer Reachability Information (NLRI) type for a given attribute. The **no** form of this command removes the L2VPN EVPN address family configuration from the device and removes all configurations under the L2VPN address family.

## Examples

This example enables BGP address family L2VPN EVPN configuration mode.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family l2vpn evpn
device(config-bgp-evpn)#
```

## History

Release version	Command history
16r.1.01	This command was introduced.

# address-family unicast (BGP)

Enables the IPv4 or IPv6 address family configuration mode to configure a variety of BGP unicast routing options.

## Syntax

```
address-family { ipv4 | ipv6 } unicast [ vrf vrf-name ]
no address-family { ipv4 | ipv6 } unicast [ vrf vrf-name ]
```

## Command Default

Disabled.

## Parameters

**ipv4**  
Specifies an IPv4 address family.

**ipv6**  
Specifies an IPv6 address family.

**vrf vrf-name**  
Specifies a VRF instance.

## Modes

BGP configuration mode

## Usage Guidelines

Use the **no** form of this command to remove IPv4 or IPv6 address family configurations from the device.

## Examples

The following example enables BGP IPv4 address-family configuration mode.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv4 unicast
device(config-bgp-ipv4u)#
```

The following example enables BGP IPv6 address-family configuration mode.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv6 unicast
device(config-bgp-ipv6u)#
```

The following example enables BGP IPv4 address-family configuration mode for VRF "green".

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv4 unicast vrf green
device(config-bgp-ipv4u-vrf)#
```

This example enables BGP IPv6 address-family configuration mode for VRF "red".

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv6 unicast vrf red
device(config-bgp-ipv6u-vrf)#
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# address-family unicast (IS-IS)

Enables the IPv4 or IPv6 address family configuration mode to configure a variety of Intermediate System-to-Intermediate System (IS-IS) unicast routing options.

## Syntax

```
address-family { ipv4 | ipv6 } unicast
```

## Command Default

Disabled.

## Parameters

**ipv4**  
Specifies the IPv4 address family.

**ipv6**  
Specifies the IPv6 address family.

## Modes

IS-IS router configuration mode

## Examples

The following example enables IS-IS address-family IPv4 unicast configuration mode.

```
device# configure terminal
device(config)# router isis
device(config-isis-router)# address-family ipv4 unicast
device(config-router-isis-ipv4u)#
```

The following example enables IS-IS address-family IPv6 unicast configuration mode.

```
device# configure terminal
device(config)# router isis
device(config-isis-router)# address-family ipv6 unicast
device(config-router-isis-ipv6u)#
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# adjustment-interval

There are two mechanisms of configuring LSP level parameters. The direct configuration and template-based configuration.

## Syntax

`adjustment-interval { value }`

`no adjustment-interval { value }`

## Command Default

The `adjustment-interval` is disabled.

## Parameters

*value*

Specifies the time interval after which the LSP bandwidth must be adjusted. The range is from 300 through 259200 seconds (30 days). The default value is 86400 seconds (one day).

## Modes

MPLS LSP configuration mode.

## Usage Guidelines

The `no` option disables the auto-bandwidth for the LSP. The bandwidth immediately is set back to the traffic-engineering configured value.

## Examples

The following example sets the bandwidth reallocation interval to 86400 seconds for LSP `xyz`.

```
device>enable
device# configure terminal
device(config)# router mpls
device(config-mpls)# lsp xyz
device(config-mpls-lsp-xyz)# auto-bandwidth
device(config-mpls-lsp-xyz-auto-bandwidth)# adjustment-interval 86400
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# adjustment-threshold

Specifies the automatic bandwidth adjustment sensitivity of an LSP to changes in bandwidth utilization.

## Syntax

**adjustment-threshold use-threshold-table**

**no adjustment-threshold**

## Command Default

The adjustment threshold is set to the default value.

## Parameters

**use-threshold-table**

Specifies that the template use the autobw-threshold table to determine the threshold.

## Modes

MPLS sub-configuration modes

config-mpls-template-template1

config-mpls-lsp-lsp1-autobw

## Usage Guidelines

When automatic bandwidth adjustment is configured, bandwidth demand for the current interval is calculated and compared to the LSP current bandwidth allocation.

The **no** form of the command sets the adjustment threshold to the default value.

## History

Release version	Command history
16r.1.00	This command was introduced.

# admin-group

Administrative groups, also known as resource classes or link colors, allows the user to assign MPLS-enabled interfaces to various classes. When a device calculates the path for an LSP, it can take into account the administrative group to which an interface belongs; the user can specify which administrative groups the device can include or exclude when making its calculation.

## Syntax

```
admin-group { admin_name admin_group_num }
no admin-group { admin_name admin_group_num }
```

## Command Default

The command is disabled, by default.

## Parameters

*admin\_name*

Specifies the selected administrative group name.

*admin\_group\_number*

Specifies the selected administrative group number. The number range is 0-31.

## Modes

MPLS policy mode.

## Usage Guidelines

Up to 32 administrative groups can be configured on the device. The user can see an administrative group either by its name or its number. Before the user can see an administrative group by its name, the user must specify a name for the group at the MPLS policy level and associate the name with that administrative group's number.

After the user associates an administrative group name with a number, the user can see it by name when assigning interfaces to the group or including or excluding the group from LSP calculations.

The **no** form of the command disables specified admin-group.

## Examples

The following example establishes three administrative groups.

```
device# configure
device(config)# router mpls
device(config-router-mpls)# policy
device(config-router-mpls-policy)# admin-group gold 30
device(config-router-mpls-policy)# admin-group silver 20
device(config-router-mpls-policy)# admin-group bronze 10
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# advertise dot1-tlv

Advertises globally to any attached device IEEE 802.1 organizationally specific Type, Length, Values (TLV) values, or for a specific LLDP profile.

## Syntax

```
advertise dot1-tlv
no advertise dot1-tlv
```

## Command Default

Advertisement is disabled.

## Modes

Protocol LLDP and profile configuration modes

## Usage Guidelines

Enter **no advertise dot1-tlv** to return to the default setting.

## Examples

The following example advertises TLV configuration for IEEE 802.1

```
device# configure terminal
device(config)# protocol lldp
device(conf-lldp)# advertise dot1-tlv
device(conf-lldp)#
```

The following example advertises TLV configuration for IEEE 802.1 for a specific LLDP profile.

```
device(conf-lldp)# profile test1
device(config-profile-test1)# advertise dot1-tlv
device(conf-profile-test1)#
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# advertise dot3-tlv

Advertises to any attached device IEEE 802.3 organizationally specific Type, Length, Values (TLV) values, or for a specific LLDP profile.

## Syntax

```
advertise dot3-tlv
no advertise dot3-tlv
```

## Command Default

Advertisement is disabled.

## Modes

Protocol LLDP and profile configuration modes.

## Usage Guidelines

Enter **no advertise dot3-tlv** to return to the default setting.

## Examples

The following example advertises TLV configuration for IEEE 802.3.

```
device# configure terminal
device(config)# protocol lldp
device(conf-lldp)# advertise dot3-tlv
device(conf-lldp)#
```

The following example advertises TLV configuration for IEEE 802.3 for a specific LLDP profile.

```
device(conf-lldp)# profile test1
device(config-profile-test1)# advertise dot3-tlv
device(conf-profile-test1)#
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# advertise-backup

Enables a backup VRRP router to send advertisement frames to the master VRRP router.

## Syntax

```
advertise-backup
no advertise-backup
```

## Command Default

Advertisement is disabled.

## Modes

Virtual-router-group configuration mode

## Usage Guidelines

If a backup router is enabled to send advertisement frames, the frames are sent every 60 seconds.

This command can be used for VRRP-E, but not for VRRP.

Enter **no advertise backup** to return to the default setting (no periodic transmission).

## Examples

To enable the backup VRRP routers to send advertisement frames to the master VRRP router:

```
device# configure terminal
device(config)# interface ve 25
device(config-ve-25)# vrrp-extended-group 1
device(config-vrrp-extended-group-1)# advertise-backup
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# advertise optional-tlv

Advertises the optional Type, Length, and Values (TLV) values, or for a specific LLDP profile.

## Syntax

```
advertise optional-tlv { management-address | port-description | system-capabilities | system-description | system-name }  
no advertise optional-tlv
```

## Command Default

Advertisement is disabled.

## Parameters

### management-address

Advertises the management address of the system.

### port-description

Advertises the user-configured port.

### system-capabilities

Advertises the capabilities of the system.

### system-description

Advertises the system firmware version and the current image running on the system.

### system-name

Advertises the name of the system.

## Modes

Protocol LLDP and profile configuration modes

## Usage Guidelines

Enter **no advertise optional-tlv** to return to the default setting.

## Examples

The following example advertises the management address of the system and the user-configured port.

```
device# configure terminal
device(config)# protocol lldp
device(conf-lldp)# advertise optional-tlv ?
Possible completions:
  management-address      Management Address TLV
  port-description        Port-Description TLV
  system-capabilities     System Capabilities TLV
  system-description      System Description
  system-name             System Name TLV
device(conf-lldp)# advertise optional-tlv management-address ?
Possible completions:
  port-description        Port-Description TLV
  system-capabilities     System Capabilities TLV
  system-description      System Description
  system-name             System Name TLV
device(conf-lldp)# advertise optional-tlv management-address port-description
device(conf-lldp)#
```

The following example advertises the management address of the system for a specific LLDP profile.

```
device(conf-lldp)# profile test1
device(config-profile-test1)# advertise optional-tlv ?
Possible completions:
  management-address      Management Address TLV
  port-description        Port-Description TLV
  system-capabilities     System Capabilities TLV
  system-description      System Description
  system-name             System Name TLV
device(conf-profile-test1)# advertise optional-tlv management-address
device(conf-profile-test1)#
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# advertisement-interval (VRRP)

Configures the interval at which the master VRRP router advertises its existence to the backup routers.

## Syntax

`advertisement-interval` *range*

## Command Default

1 second for version 2, 1000 milliseconds for version 3.

## Parameters

*range*

Interval at which the master VRRP router advertises its existence to the backup routers. Valid values range from 1 through 255 seconds for VRRPv2 and from 100 through 40900 milliseconds for VRRPv3.

## Modes

Virtual-router-group configuration mode

## Usage Guidelines

This interval is the length of time, in seconds, between each advertisement sent from the master to its backup VRRP routers. The advertisement notifies the backup routers that the master is still active. If the backup routers do not receive an advertisement from the master in a designated amount of time, the backup with the highest priority can assume the role of master.

This command can be used for either VRRP or VRRP-E and for VRRPv3 and VRRP-Ev3.

## Examples

To set the advertisement interval to 30 seconds for VRRP-E group 10:

```
device# configure terminal
device(config)# interface ve 25
device(config-ve-25)# vrrp-extended-group 10
device(config-vrrp-extended-group-10)# advertisement-interval 30
```

To set the advertisement interval to 3000 milliseconds for VRRP-Ev3 group 19:

```
device# configure terminal
device(config)# interface ve 2019
device(config-ve-2019)# ipv6 vrrp-extended-group 19
device(config-vrrp-extended-group-19)# advertisement-interval 3000
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# advertisement-interval-scale

Configures subsecond intervals at which the master VRRP-Ev3 device advertises its existence to the backup routers.

## Syntax

**advertisement-interval-scale** *scale*

## Command Default

The default advertisement interval scale is 1.

## Parameters

*scale*

Number representing the scale of the division of a configured interval at which the master VRRP-Ev3 device advertises its existence to the backup devices. Valid values are 1, 2, 5 and 10.

## Modes

Virtual-router-group configuration mode

## Usage Guidelines

This command scales the advertisement interval of the master VRRP-Ev3 device as configured by the **advertisement-interval** command. A value of 1, 2, 5, or 10 can be set and the existing advertisement interval value is divided by the scaling value, for example, if the advertisement interval is set to 1 second and the scaling value is set to 10, the new advertisement interval is 100 milliseconds. When all the advertisement intervals in a VRRP-Ev3 session are scaled, subsecond VRRP-Ev3 convergence is possible if a master fails. The advertisement notifies the backup devices that the master is still active. If the backup devices do not receive an advertisement from the master in a designated amount of time, the backup device with the highest priority can assume the role of master. Using subsecond advertising intervals, subsecond device redundancy can be achieved.

This command is only supported by VRRP-Ev3.

## Examples

To set the scaling of the advertisement interval to 500 milliseconds for VRRP-Ev3 group 19:

```
device# configure terminal
device(config)# interface ve 2019
device(config-ve-25)# ipv6 vrrp-extended-group 19
device(config-vrrp-extended-group-10)# advertisement-interval 1
device(config-vrrp-extended-group-10)# advertisement-interval-scale 2
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# aggregate-address (BGP)

Configures the device to aggregate routes from a range of networks into a single network prefix.

## Syntax

```
aggregate-address { ip-addr ip-mask | ipv6-addr ipv6-mask } [ advertise-map map-name | as-set | attribute-map map-name | summary-only | suppress-map map-name ]
```

```
no aggregate-address { ip-addr ip-mask | ipv6-addr ipv6-mask } [ advertise-map map-name | as-set | attribute-map map-name | summary-only | suppress-map map-name ]
```

## Command Default

The address aggregation feature is disabled. By default, the device advertises individual routes for all networks.

## Parameters

*ip-addr*

IPv4 address.

*ip-mask*

IPv4 mask.

*ipv6-addr*

IPv6 address.

*ipv6-mask*

IPv6 mask.

### **advertise-map**

Causes the device to advertise the more-specific routes in the specified route map.

*map-name*

Specifies a route map to be consulted. Range is from 1 through 63 ASCII characters.

### **as-set**

Causes the device to aggregate AS-path information for all routes in the aggregate routes from a range of networks into a single network prefix.

### **attribute-map**

Causes the device to set attributes for the aggregate routes according to the specified route map.

*map-name*

Specifies a route map to be consulted.

### **summary-only**

Prevents the device from advertising more-specific routes contained within the aggregate route.

### **suppress-map**

Prevents the more-specific routes contained in the specified route map from being advertised.

*map-name*

Specifies a route map to be consulted.

## Modes

BGP address-family IPv4 unicast configuration mode  
 BGP address-family IPv6 unicast configuration mode  
 BGP address-family IPv4 unicast VRF configuration mode  
 BGP address-family IPv6 unicast VRF configuration mode

## Usage Guidelines

Use the **no** form of this command to restore the defaults.

## Examples

The following example aggregates routes from a range of networks into a single network prefix under the IPv6 address family and advertises the paths for this route as AS\_SET.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv6 unicast
device(config-bgp-ipv6u)# aggregate-address 2001:db8::/32 as-set
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# alias

Configures global or user-level aliases for device commands.

## Syntax

**alias** *alias-name expansion*

**no alias** *alias-name*

## Parameters

*alias-name*

Specifies the alias name. The number of characters can be from 1 through 255.

*expansion*

Specifies the CLI command to be triggered when the alias is entered. If the command is more than one word, type double quotes (") around the command. The number of characters can be from 1 through 1023.

## Modes

Alias configuration mode

User-alias configuration mode

## Usage Guidelines

Global aliases are available to all users.

User-level aliases are available only for a specified user.

In the alias configuration mode, to delete a global alias use the **no** form of his command.

In the user-alias configuration mode, to delete a user alias use the **no** form of his command.

## Examples

The following example defines **ck** as a global alias that enters the **show clock** command.

```
device# configure terminal
device(config)# alias-config
device(config-alias-config)# alias ck "show clock"
```

For the user **jdoe**, the following example defines **sv** as a user-level alias that enters the **show version** command.

```
device# configure terminal
device(config)# alias-config
device(config-alias-config)# user jdoe
device(config-user-jdoe)# alias sv "show version"
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# alias-config

Launches the alias configuration mode, enabling you to define aliases.

## Syntax

```
alias-config
no alias-config [ alias | user username ]
```

## Parameters

**alias**  
(For the **no** option) Deletes all global aliases.

**user *username***  
(For the **no** option) Deletes all aliases defined for the specified user.

## Modes

Global configuration mode

## Usage Guidelines

From the alias configuration mode—which you access by entering this command—you can manage global aliases. From that mode, you can also access the user-alias configuration mode for a specified user, from which you can manage aliases for that user.

To delete all global aliases, use the **no alias-config alias** form of this command.

To delete all aliases defined for a specified user, use the **no alias-config user** form of this command.

## Examples

The following example accesses the alias configuration mode. It then defines `ck` as a global alias for the **show clock** command.

```
device# configure terminal
device(config)# alias-config
device(config-alias-config)# alias ck "show clock"
```

The following example deletes all aliases defined for the user `jdoe`.

```
device# configure terminal
device(config)# no alias-config user jdoe
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# allow-conflicting-rules

Towards editing ACLs, disables the default restriction on conflicting rules within an ACL. You can then create a conflicting rule before deleting the previous version.

## Syntax

`allow-conflicting-rules`

`no allow-conflicting-rules`

## Command Default

Conflicting rules are not allowed within an ACL.

## Modes

ACL policy mode

## Usage Guidelines

If the only difference between two rules is that one is a **deny** and the other a **hard-drop**, they are not considered conflicting. However, they are considered duplicates; refer to the **allow-duplicate-rules** topic.

Towards modifying ACL rules, you do not need to first remove ACLs from interfaces. Changes are implemented "on the fly," with no gap in protection.

Extreme recommends that after ACL-editing sessions towards which you enabled **allow-conflicting-rules**, restore the default setting—by entering the **no allow-conflicting-rules** command.

Entering **no allow-conflicting-rules** launches a check of all ACLs for conflicting rules. If you did not immediately restore the default setting, and created ACLs with conflicting rules, you will need to delete conflicting rules before the software accepts **no allow-conflicting-rules**.

## Examples

When modifying ACLs by changing a rule from **permit** to **deny** or **hard-drop**—or vice versa—the following flow is typical.

1. Enter the **show running-config** command to display the rules in the ACL that you need to modify.

```
device# show running-config mac access-list extended macl
mac access-list extended macl
  seq 10 permit host 0001.0001.0001 any
  seq 20 deny host 0001.0001.0002 any count
  seq 30 hard-drop host 0001.0001.0003 any mirror
```

2. Enter the **allow-conflicting-rules** command.

```
device# configure terminal
device(config)# acl-policy
device(config-acl-policy)# allow-conflicting-rules
```

3. In the ACL that you need to modify, create the new rule and then delete the old rule.

```
device(config-acl-policy)# exit
device(config)# mac access-list macl
device(conf-macl-ext)# seq 21 permit host 0001.0001.0002 any count
device(conf-macl-ext)# no seq 20
```

4. Enter the **no allow-conflicting-rules** command to restore the default setting.

```
device(conf-macl-ext)# exit
device(config)# acl-policy
device(config-acl-policy)# no allow-conflicting-rules
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# allow-duplicate-rules

Towards editing ACLs, disables the default restriction on duplicate rules within an ACL. You can then create a duplicate rule at a new sequence before deleting the previous version.

## Syntax

`allow-duplicate-rules`

`no allow-duplicate-rules`

## Command Default

Duplicate rules are not allowed within an ACL.

## Modes

ACL policy mode

## Usage Guidelines

If the only difference between two rules is that one is a **deny** and the other a **hard-drop**, they are considered duplicates.

Towards modifying ACL rules, you do not need to first remove ACLs from interfaces. Changes are implemented "on the fly," with no gap in protection.

Extreme recommends that after ACL-editing sessions towards which you enabled **allow-duplicate-rules**, restore the default setting—by entering the **no allow-duplicate-rules** command.

Entering **no allow-duplicate-rules** launches a check of all ACLs for duplicate rules. If you did not immediately restore the default setting, and created ACLs with duplicate rules, you will need to delete duplicates before the software accepts **no allow-duplicate-rules**.

## Examples

When editing ACLs by duplicating a rule into a new sequence and then deleting the original rule, the following flow is typical.

1. Enter the **show running-config** command to display the rules in the ACL that you need to modify.

```
device# show running-config mac access-list extended macl
mac access-list extended macl
  seq 10 permit host 0001.0001.0001 any
  seq 20 deny host 0001.0001.0002 any count
  seq 30 hard-drop host 0001.0001.0003 any mirror
```

2. Enter the **allow-duplicate-rules** command.

```
device# configure terminal
device(config)# acl-policy
device(config-acl-policy)# allow-duplicate-rules
```

3. In the ACL that you need to modify, create the duplicate rule—specifying the new sequence number—and then delete the old rule.

```
device(config-acl-policy)# exit
device(config)# mac access-list macl
device(conf-macl-ext)# seq 11 hard-drop host 0001.0001.0003 any mirror
device(conf-macl-ext)# no seq 30
```

4. Enter the **no allow-duplicate-rules** command to restore the default setting.

```
device(conf-macl-ext)# exit
device(config)# acl-policy
device(config-acl-policy)# no allow-duplicate-rules
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# always-compare-med

Configures the device always to compare the Multi-Exit Discriminators (MEDs), regardless of the autonomous system (AS) information in the paths.

## Syntax

```
always-compare-med
no always-compare-med
```

## Modes

BGP configuration mode

## Usage Guidelines

The **no** form of the command disallows the comparison of the MEDs for paths from neighbors in different autonomous systems.

## Examples

The following example configures the device always to compare the MEDs.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# always-compare-med
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# always-propagate

Enables the device to advertise BGP routes even though they are not installed in the RIB Manager.

## Syntax

**always-propagate**

**no always-propagate**

## Command Default

This feature is disabled.

## Modes

BGP address-family IPv4 unicast configuration mode

BGP address-family IPv6 unicast configuration mode

BGP address-family IPv4 unicast VRF configuration mode

BGP address-family IPv6 unicast VRF configuration mode

## Usage Guidelines

Use the **no** form of this command to restore the default.

## Examples

This example configures the device to advertise routes that are not installed in the RIB manager.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv4 unicast
device(config-bgp-ipv4u)# always-propagate
```

This example configures the device to reflect advertise that are not installed in the RIB manager in IPv6 address-family unicast configuration mode.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv6 unicast
device(config-bgp-ipv6u)# always-propagate
```

This example configures the device to advertise routes that are not installed in the RIB manager in a nondefault VRF instance.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv4 unicast vrf red
device(config-bgp-ipv4u-vrf)# always-propagate
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# anycast-rp

Configures PIM anycast rendezvous points (RPs) in IPv4 and IPv6 multicast domains.

## Syntax

```
anycast-rp rp-address
```

```
no anycast-rp rp-address
```

## Command Default

PIM anycast RPs are not configured.

## Parameters

*rp-address*

Specifies a shared RP address used among multiple PIM routers.

## Modes

PIM router configuration mode

## Usage Guidelines

The **no** form of this command removes the anycast RP configuration.

PIM Anycast RP is a method of providing load balancing and fast convergence to PIM RPs in an IPv4 multicast domain. The RP address of the Anycast RP is a shared address used among multiple PIM routers, known as PIM RP. The PIM RP routers create an Anycast RP set. Each router in the Anycast RP set is configured using two IP addresses; a shared RP address in their loopback address and a separate, unique ip address. The loopback address must be reachable by all PIM routers in the multicast domain. The separate, unique IP address is configured to establish static peering with other PIM routers and communication with the peers.

When the source is activated in a PIM Anycast RP domain, the PIM First Hop (FH) will register the source to the closet PIM RP. The PIM RP follows the same MSDP Anycast RP operation by decapsulating the packet and creating the (s,g) state. If there are external peers in the Anycast RP set, the router will re-encapsulate the packet with the local peering address as the source address of the encapsulation. The router will unicast the packet to all Anycast RP peers. The re-encapsulation of the data register packet to Anycast RP peers ensures source state distribution to all RPs in a multicast domain.



## Examples

The following example shows how to configure PIM anycast RP.

```
device(config-pim-router)# anycast-rp101.101.101.101 my-anycast-rps
device(config-pim-router)# exit
device(config)# ip prefix-list my-anycast-rpspermit 1.1.1.1/32
device(config)# ip prefix-list my-anycast-rpspermit 2.2.2.2/32
device(config)# interface loopback 1
device(config-Loopback-1)# ip address 1.1.1.1/32
device(config-Loopback-1)# ip pim-sparse
device(config)#interface loopback 2
device(config-Loopback-2)# ip address 2.2.2.2/32
device(config-Loopback-2)# ip pim-sparse
device(config-Loopback-11)# ip address 101.101.101.101/32
device(config-Loopback-11# ip pim-sparse
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# area authentication (OSPFv3)

Enables authentication for an OSPF Version 3 (OSPFv3) area.

## Syntax

```
area { A.B.C.D | decimal } authentication spi value { ah | esp null } { hmac-md5 | hmac-sha1 } key key  
no area { A.B.C.D | decimal } authentication spi value
```

## Command Default

Authentication is not enabled on an area.

## Parameters

*A.B.C.D*

Area address in dotted decimal format.

*decimal*

Area address in decimal format.

**spi**

Specifies the Security Policy Index (SPI).

*value*

Specifies the Security Policy Index (SPI) value. Valid values range from decimal numbers 512 through 4294967295

**ah**

Specifies authentication header (ah) as the protocol to provide packet-level security.

**esp**

Specifies Encapsulating Security Payload (ESP) as the protocol to provide packet-level security.

**null**

Specifies that the ESP payload is not encrypted.

**hmac-md5**

Enables Hashed Message Authentication Code (HMAC) Message Digest 5 (MD5) authentication on the OSPF area.

**hmac-sha1**

Enables HMAC Secure Hash Algorithm 1 (SHA-1) authentication on the OSPF area.

**key**

Number used in the calculation of the message digest.

*key*

The 40 hexadecimal character key.

## Modes

OSPFv3 router configuration mode

OSPFv3 router VRF configuration mode

## Usage Guidelines

Enter **no area authentication spi** to remove an authentication specification for an area from the configuration.

## Examples

The following example enables ah and MD5 authentication for an OSPF area, setting a SPI value of 750.

```
device# configure terminal
device(config)# ip router-id 10.1.2.3
device(config)# ipv6 router ospf
device(config-ipv6-router-ospf-vrf-default-vrf)# area 0 authentication spi 750 ah hmac-md5 key
abcef12345678901234fedcba098765432109876
```

The following example enables esp and SHA-1 authentication for an OSPF area, setting a SPI value of 900.

```
device# configure terminal
device(config)# ip router-id 10.1.2.3
device(config)# ipv6 router ospf
device(config-ipv6-router-ospf-vrf-default-vrf)# area 0 authentication spi 900 esp null hmac-md5 sha1
abcef12345678901234fedcba098765432109876
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# area nssa (OSPFv2)

Creates a not-so-stubby area (NSSA) or modifies its parameters.

## Syntax

```
area { ip-addr | decimal } nssa { metric [ no-summary ] | default-information-originate }
no area nssa
```

## Command Default

No areas are created.

## Parameters

*ip-addr*

Area address in IP address format.

*decimal*

Area address in decimal format.

*metric*

Additional cost for using a route to or from this area.

**no-summary**

When configured on the NSSA area border router (ABR), this parameter prevents any Type 3 and Type 4 summary link-state advertisement (LSA) from being injected into the area. The only exception is that a default route is injected into the NSSA by the ABR, and strictly as a Type 3 LSA (not a Type 7, because that could cause intra-AS traffic to get routed out the AS). This makes the NSSA an NSSA totally stubby area, which can only have Type 1, 2 and 7 LSAs.

**Note:** This parameter is disabled by default, which means the default route must use a Type 7 LSA.

**default-information-originate**

When configured on the ABR, this parameter injects a Type 7 default route into the NSSA area. As a result, the other NSSA routers install the default route through the advertising NSSA ABR. By default the NSSA ABR does not originate a default route to the NSSA.

## Modes

OSPF router configuration mode

OSPF router VRF configuration mode

## Usage Guidelines

NSSAs are typically needed when one-way transmission of Type-5 LSAs (out of the area) is desired but injection of the same LSAs into the area is not acceptable.

Once created, the type of the area cannot be changed. The only exception to this rule is that an NSSA or stub area can be changed to a totally NSSA or a totally stub area, respectively.

The **no** form of the command deletes a NSSA.

## Examples

The following example sets an additional cost of 5 on an NSSA identified as 2, includes the no-summary parameter, and prevents the device from importing type 3 and type 4 summary LSAs into the NSSA area.

```
device# configure terminal
device(config)# router ospf
device(config-router-ospf-vrf-default-vrf)# area 2 nssa 5 no-summary
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# area nssa (OSPFv3)

Creates a not-so-stubby area (NSSA) or modifies its parameters.

## Syntax

```
area { ip-addr | decimal } nssa [ metric ] [ default-information-originate [ metric num ] [ metric-type { type1 | type2 } ] ] [ no-
redistribution ] [ no-summary ] [ translator-always ] [ translator-interval interval ]
```

```
no area nssa
```

## Command Default

No areas are created.

## Parameters

*ip-addr*

Area address in IP address format.

*decimal*

Area address in decimal format.

*metric*

Additional cost for using a route to or from this area. Valid values range from 1 through 1048575.

### default-information-originate

When configured on the ABR, this parameter injects a Type 7 default route into the NSSA area. As a result, the other NSSA routers install the default route through the advertising NSSA ABR. By default the NSSA ABR does not originate a default route to the NSSA.

### metric-type

Specifies how the cost of a neighbor metric is determined.

#### type1

The metric of a neighbor is the cost between itself and the router plus the cost of using this router for routing to the rest of the world.

#### type2

The metric of a neighbor is the total cost from the redistributing routing to the rest of the world.

### no-redistribution

The no-redistribution parameter prevents an NSSA ABR from generating external (type-7) LSA into a NSSA area. This is used in the case where an ASBR should generate type-5 LSA into normal areas and should not generate type-7 LSA into a NSSA area. By default, redistribution is enabled in a NSSA.

### no-summary

When configured on the NSSA area border router (ABR), this parameter prevents any Type 3 and Type 4 summary link-state advertisement (LSA) from being injected into the area. The only exception is that a default route is injected into the NSSA by the ABR, and strictly as a Type 3 LSA (not a Type 7, because that could cause intra-AS traffic to get routed out the AS). This makes the NSSA a NSSA totally stubby area, which can only have Type 1, 2 and 7 LSAs.

**Note:** This parameter is disabled by default, which means the default route must use a Type 7 LSA.

**translator-always**

Configures the translator-role. When configured on an ABR, this causes the router to unconditionally assume the role of a NSSA translator. By default, translator-always is not set, the translator role by default is candidate.

**translator-interval** *interval*

Configures the time interval for which an elected NSSA translator continues to perform its duties even after its NSSA translator role has been disposed by another router. Valid values range from 10 through 60 seconds. By default the stability-interval is 40 seconds.

## Modes

OSPFv3 router configuration mode

OSPFv3 router VRF configuration mode

## Usage Guidelines

NSSAs are typically needed when one-way transmission of Type-5 LSAs (out of the area) is desired but injection of the same LSAs into the area is not acceptable.

Once created, the type of the area cannot be changed. The only exception to this rule is that a NSSA or stub area can be changed to a totally NSSA or a totally stub area, respectively.

The **no** form of the command deletes a NSSA.

## Examples

The following example sets an additional cost of 4 on a NSSA identified as 8 (in decimal format), and prevents any Type 3 or Type 4 summary LSAs from being injected into the area.

```
device# configure terminal
device(config)# ipv6 router ospf
device(config-ipv6-router-ospf-vrf-default-vrf)# area 8 nssa 4 no-summary
```

## History

Release version	Command history
16r.1.00	This command was introduced.

## area prefix-list (OSPFv2)

Filters prefixes advertised in type 3 link-state advertisements (LSAs) between OSPFv2 areas of an area border router (ABR).

### Syntax

```
area { ip-addr | decimal } prefix-list name { in | out }
no area { ip-addr | decimal } prefix-list name { in | out }
```

### Parameters

*ip-addr*

Area address in IP address format.

*decimal*

Area address in decimal format.

**prefix-list** *name*

Specifies a prefix-list between 1 and 32 characters.

**in**

Specifies that the prefix list is applied to prefixes advertised to the specified area from other areas.

**out**

Specifies that the prefix list is applied to prefixes advertised out of the specified area to other areas.

### Modes

OSPF router configuration mode

OSPF router VRF configuration mode

### Usage Guidelines

This command is only applicable to ABRs. The **no** form of the command changes or cancels the configured filter and advertises all type 3 LSAs.

### Examples

The following example applies a prefix list to type 3 LSAs advertised out of an area with the area-id 10.1.1.1.

```
device# configure terminal
device(config)# router ospf
device(config-router-ospf-vrf-default-vrf)# area 10.1.1.1 prefix-list myprefixlist out
```

The following example applies a prefix list to type 3 LSAs advertised in to an area with the area-id 10.1.1.1.

```
device# configure terminal
device(config)# router ospf
device(config-router-ospf-vrf-default-vrf)# area 10.1.1.1 prefix-list myprefixlist in
```



## History

Release version	Command history
16r.1.00	This command was introduced.

# area range (OSPFv2)

Specifies area range parameters on an area border router (ABR).

## Syntax

**area** { *A.B.C.D* | *decimal* } **range** *E.F.G.H I.J.K.L* **advertise** [ **cost** *cost\_value* ]

**area** { *A.B.C.D* | *decimal* } **range** *E.F.G.H I.J.K.L* **not-advertise** [ **cost** *cost\_value* ]

**area** { *A.B.C.D* | *decimal* } **range** *E.F.G.H I.J.K.L* **cost** *cost\_value*

**no area range**

## Parameters

*A.B.C.D*

Area address in IP address format.

*decimal*

Area address in decimal format.

*E.F.G.H I.J.K.L*

Specifies the IP address and mask portion of the range. All network addresses that match this network are summarized in a single route and advertised by the ABR.

**advertise**

Sets the address range status to *advertise* and generates a Type 3 summary LSA.

**cost** *cost\_value*

Sets the cost value for the area range. This value is used as the generated summary LSA cost. The range for *cost\_value* is 1 to 6777214. If this value is not specified, the cost value is the default range metric calculation for the generated summary LSA cost.

**not-advertise**

Sets the address range status to DoNotAdvertise; the Type 3 LSA is suppressed, and the component networks remain hidden from other networks. This setting is used to temporarily pause route summarization from the area.

## Modes

OSPF router configuration mode

OSPF router VRF configuration mode

## Usage Guidelines

Use this command only on ABRs to specify route summarization for an existing area. The result is that a single summary route is advertised to other areas by the ABR, in the form of a Type 3 LSA. Routing information is condensed at area boundaries and external to the area, and only a single route is advertised for each address range.

An example of when you might want to use this command is if you have many small networks advertised from area 0 to any other area, or from any non-backbone area into the backbone. This command gives you a summary route instead of many

smaller routes. In an area, the OSPF database on each router must be an exact copy of the databases of the other routers. This means that no summarization is allowed within the area.

The **no** form of the command disables the specification of range parameters on an ABR.

## Examples

The following example advertises to Area 3 all the addresses on the network 10.1.1.0 10.255.255.0 in the ABR you are signed into.

```
device# configure terminal
device(config)# router ospf
device(config-router-ospf-vrf-default-vrf)# area 3 range 10.1.1.0 10.255.255.0 advertise
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# area range (OSPFv3)

Specifies area range parameters on an area border router (ABR).

## Syntax

```
area { ip-addr | decimal } range ipv6 address/mask [ advertise | not-advertise ] [ cost cost_value ]
no area range
```

## Parameters

*ip-addr*

Area address in IP address format.

*decimal*

Area address in decimal format.

*ipv6 address/mask*

Specifies the IPv6 address in dotted-decimal notation and the IPv6 mask in CIDR notation. All network addresses that match this network are summarized in a single route and advertised by the ABR.

**advertise**

Sets the address range status to *advertise* and generates a Type 3 summary LSA.

**cost** *cost\_value*

Sets the cost value for the area range. This value is used as the generated summary LSA cost. The range for *cost\_value* is 1 to 6777214. If this value is not specified, the cost value is the default range metric calculation for the generated summary LSA cost.

**not-advertise**

Sets the address range status to DoNotAdvertise; the Type 3 LSA is suppressed, and the component networks remain hidden from other networks. This setting is used to temporarily pause route summarization from the area.

## Modes

OSPFv3 router configuration mode

OSPFv3 router VRF configuration mode

## Usage Guidelines

Use this command only on ABRs to specify route summarization for an existing area. The result is that a single summary route is advertised to other areas by the ABR, in the form of a Type 3 LSA. Routing information is condensed at area boundaries and external to the area, and only a single route is advertised for each address range.

An example of when you might want to use this command is if you have many small networks advertised from area 0 to any other area, or from any non-backbone area into the backbone. This command gives you a summary route instead of many smaller routes. In an area, the OSPF database on each router must be an exact copy of the databases of the other routers. This means that no summarization is allowed within the area.

The **no** form of the command disables the specification of range parameters on an ABR.

## Examples

The following example advertises to Area 3 all the addresses on the network 2001:db8:8::/45 in the ABR you are signed into.

```
device# configure terminal
device(config)# ipv6 router ospf
device(config-ipv6-router-ospf-vrf-default-vrf)# area 3 range 2001:db8:8::/45 advertise
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# area stub (OSPFv2)

Creates or deletes a stub area or modifies its parameters.

## Syntax

```
area { ip-addr | decimal } stub metric [ no-summary ]
no area stub
```

## Command Default

No areas are created.

## Parameters

*A.B.C.D*

Area address in IP address format.

*decimal*

Area address in decimal format.

*metric*

Additional cost for using a route to or from this area. Valid values range from 1 through 6777215.

**no-summary**

When configured on the ABR, this parameter prevents any Type 3 and Type 4 summary LSAs from being injected into the area. The only exception is that a default route is injected into the stub/totally stubby area by the ABR as a Type 3 LSA. Enabling this parameter makes the area a so-called totally stubby area, which can only have Types 1 and 2. This parameter is disabled by default.

## Modes

OSPF router configuration mode

OSPF router VRF configuration mode

## Usage Guidelines

Once created, the type of the area cannot be changed. The only exception to this rule is that a NSSA or stub area can be changed to a totally NSSA or a totally stub area, respectively.

The **no** form of the command deletes a stub area.

## Examples

The following example sets an additional cost of 5 on a stub area called 2.

```
device# configure terminal
device(config)# router ospf
device(config-router-ospf-vrf-default-vrf)# area 2 stub 5
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# area stub (OSPFv3)

Creates or deletes a stub area or modifies its parameters.

## Syntax

**area** { *ip-addr* | *decimal* } **stub** *metric*

**area** { *ip-addr* | *decimal* } **stub no-summary** *metric*

**no area stub**

## Command Default

No areas are created.

## Parameters

*ip-addr*

Area address in IP address format.

*decimal*

Area address in decimal format.

*metric*

Additional cost for using a route to or from this area. Valid values range from 3 through 1048575.

**no-summary**

When configured on the ABR, this parameter prevents any Type 3 and Type 4 summary LSAs from being injected into the area. The only exception is that a default route is injected into the stub/totally stubby area by the ABR as a Type 3 LSA. Enabling this parameter makes the area a so-called totally stubby area, which can only have Types 1 and 2. This parameter is disabled by default.

## Modes

OSPFv3 router configuration mode

OSPFv3 router VRF configuration mode

## Usage Guidelines

Once created, the type of the area cannot be changed. The only exception to this rule is that a NSSA or stub area can be changed to a totally NSSA or a totally stub area, respectively.

The **no** form of the command deletes a stub area.



## Examples

The following example sets an additional cost of 5 on a stub area called 2.

```
device# configure terminal
device(config)# ipv6 router ospf
device(config-ipv6-router-ospf-vrf-default-vrf)# area 2 stub 5
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# area virtual-link (OSPFv2)

Creates or modifies virtual links for an area.

## Syntax

```
area { ip-addr | decimal } virtual-link E.F.G.H [ authentication-key password ] [ dead-interval time ] [ hello-interval time ]
  [ md5-authentication { key-activation-wait-time time | key-id num key } ] [ retransmit-interval time ] [ transmit-delay
    time ]
```

```
no area virtual-link
```

## Command Default

No virtual links are created.

## Parameters

*ip-addr*

Area address in IP address format.

*decimal*

Area address in decimal format.

*E.F.G.H*

ID of the OSPF router at the remote end of the virtual link.

**authentication-key** *password*

Sets the password and encryption method. Only one encryption method can be active on an interface at a time. All OSPF packets transmitted on the interface contain this password. All OSPF packets received on the interface are checked for this password. If the password is not present, then the packet is dropped.

**dead-interval** *time*

How long a neighbor router waits for a hello packet from the current router before declaring the router down. This value must be the same for all routers and access servers that are attached to a common network. Valid values range from 3 through 65535 seconds. The default is 40 seconds.

**hello-interval** *time*

Time between hello packets that the router sends on an interface. The value must be the same for all routers and access servers that are attached to a common network. Valid values range from 1 through 65535 seconds. The default is 10 seconds.

**md5-authentication**

Sets either MD5 key-activation wait time or key identifier.

**key-activation-wait-time** *time*

Time before a newly configured MD5 authentication key is valid. This parameter provides a graceful transition from one MD5 key to another without disturbing the network. All new packets transmitted after the wait time ends will use the newly configured MD5 Key. OSPF packets that contain the old MD5 key are accepted for up to five minutes (300 seconds) after the new MD5 key is in operation. Valid values range from 0 through 14400 seconds. The default is 300 seconds.

**key-id** *num key*

The *num* is a number between 1 and 255 which identifies the MD5 key being used. This parameter is required to differentiate among multiple keys defined on a device. When MD5 is enabled, the key is an alphanumeric password of up to 16 characters that is later encrypted and included in each OSPF packet transmitted. You must enter a password in this field when the system is configured to operate with either simple or MD5 authentication. By default, the MD5 authentication key is encrypted.

**retransmit-interval** *time*

Time between Link State Advertisement (LSA) retransmissions for adjacencies belonging to the interface. Set this interval to a value larger than the expected round-trip delay between any two routers on the attached network. Valid values range from 0 through 3600 seconds. The default is 5 seconds.

**transmit-delay** *time*

Estimated time required to send an LSA on the interface. This value must be an integer greater than zero. The age of each LSA in the update packet is incremented by the value of this parameter before transmission occurs. Valid values range from 0 through 3600 seconds. The default is 1 second.

## Modes

OSPF router configuration mode

OSPF router VRF configuration mode

## Usage Guidelines

The **no** form of the command removes a virtual link.

## Examples

The following example creates a virtual link for an area whose decimal address is 1, and where the ID of the OSPFv2 device at the remote end of the virtual link is 10.1.2.3.

```
device# configure terminal
device(config)# router ospf
device(config-router-ospf-vrf-default-vrf)# area 1 virtual-link 10.1.2.3
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# area virtual-link (OSPFv3)

Creates or modifies virtual links for an area.

## Syntax

```
area { ip-addr | decimal } virtual-link A.B.C.D [ dead-interval time | hello-interval time | hello-jitter interval | retransmit-interval time | transmit-delay time ]
```

```
no area virtual-link
```

## Command Default

No virtual links are created.

## Parameters

*ip-addr*

Area address in IP address format.

*decimal*

Area address in decimal format.

*A.B.C.D*

ID of the OSPFv3 device at the remote end of the virtual link.

**dead-interval** *time*

How long a neighbor device waits for a hello packet from the current device before declaring the device down. This value must be the same for all devices and access servers that are attached to a common network. Valid values range from 3 through 65535 seconds. The default is 40 seconds.

**hello-interval** *time*

Time between hello packets that the device sends on an interface. The value must be the same for all devices and access servers that are attached to a common network. Valid values range from 1 through 65535 seconds. The default is 10 seconds.

**hello-jitter** *interval*

Sets the allowed jitter between hello packets. Valid values range from 1 through 50 percent (%). The default value is 10%.

**retransmit-interval** *time*

Time between Link State Advertisement (LSA) retransmissions for adjacencies belonging to the interface. Set this interval to a value larger than the expected round-trip delay between any two devices on the attached network. Valid values range from 1 through 3600 seconds. The default is 5 seconds.

**transmit-delay** *time*

Estimated time required to send an LSA on the interface. This value must be an integer greater than zero. The age of each LSA in the update packet is incremented by the value of this parameter before transmission occurs. Valid values range from 0 through 3600 seconds. The default is 1 second.

## Modes

- OSPFv3 router configuration mode
- OSPFv3 router VRF configuration mode

## Usage Guidelines

The values of the **dead-interval** and **hello-interval** parameters must be the same at both ends of a virtual link. Therefore, if you modify the values of these parameters at one end of a virtual link, you must make the same modifications on the other end of the link. The values of the other virtual link parameters do not require synchronization.

The **no** form of the command removes a virtual link.

## Examples

The following example creates a virtual link for an area whose decimal address is 1, and where the ID of the OSPFv3 device at the remote end of the virtual link is 209.157.22.1.

```
device# configure terminal
device(config)# ipv6 router ospf
device(config-ipv6-router-ospf-vrf-default-vrf)# area 1 virtual-link 209.157.22.1
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# area virtual-link authentication (OSPFv3)

Enables authentication for virtual links in an OSPFv3 area.

## Syntax

```
area { ip-addr | decimal } virtual-link E.F.G.H authentication spi spi-value { ah | esp null } { hmac-md5 | hmac-sha1 } key key  
no area { A.B.C.D | decimal } virtual-link E.F.G.H authentication spi spi
```

## Command Default

Authentication is not enabled on a virtual-link.

## Parameters

*ip-addr*

Area address in IP address format.

*decimal*

Area address in decimal format.

*E.F.G.H*

ID of the OSPFv3 device at the remote end of the virtual link.

spi *spi-value*

Specifies the security policy index (SPI) value. Valid values range from decimal numbers 512 through 4294967295

ah

Specifies authentication header (ah) as the protocol to provide packet-level security.

esp

Specifies Encapsulating Security Payload (ESP) as the protocol to provide packet-level security.

null

Specifies that the ESP payload is not encrypted.

hmac-md5

Enables Hashed Message Authentication Code (HMAC) Message Digest 5 (MD5) authentication on the OSPF area.

hmac-sha1

Enables HMAC Secure Hash Algorithm 1 (SHA-1) authentication on the OSPF area.

key *key*

Number used in the calculation of the message digest. 40 hexadecimal character key. The 40 hexadecimal character key is encrypted by default.

## Modes

OSPFv3 router configuration mode

OSPFv3 router VRF configuration mode

## Usage Guidelines

Enter **no area** { *A.B.C.D* | *decimal* } **virtual-link** *E.F.G.H* **authentication spi** *spi* to remove authentication from the virtual-links in the area.

## Examples

The following example configures IPsec on a virtual link in an OSPFv3 area.

```
device# configure terminal
device(config)# ip router-id 10.1.2.2
device(config)# ipv6 router ospf
device(config-ipv6-router-ospf-vrf-default-vrf)# area 2 virtual-link 10.1.2.2 authentication spi 600 ah
hmac-sha1 key 1134567890223456789012345678901234567890
```

## History

Release version	Command history
16r.1.00	This command was introduced.

## arp

Creates a static Address Resolution Protocol (ARP) entry.

## Syntax

```
arp A.B.C.D mac-address interface { ethernet slot / port | ve ve_id }
no arp A.B.C.D
```

## Parameters

*A.B.C.D*

Specifies a valid IP address.

*mac-address*

Specifies a valid MAC address.

**interface**

Specifies an interface type.

**ethernet**

Specifies a physical Ethernet interface.

*slot*

Specifies a valid slot number.

*port*

Specifies a valid port number.

**ve** *ve\_id*

Specifies a virtual Ethernet (VE) interface.

## Modes

Global configuration mode

VRF configuration mode

## Usage Guidelines

The **no** form of the command deletes a static ARP entry.

## Examples

The following example creates a static ARP entry that associates an IP address, a MAC address, and a physical port.

```
device# configure terminal
device(config)# arp 10.53.4.2 1245.7654.2348 interface ethernet 2/1
```



The following example configures a static ARP within a user-defined VRF.

```
device# configure terminal
device(config)# vrf test
device(config-vrf-test)# address-family ipv4 unicast
device(vrf-test-ipv4-unicast)# arp 10.6.6.7 0001.0001.0001 interface ethernet 2/1
```

## History

Release version	Command history
16r.1.00	This command was introduced.

## arp access-list

Creates an Address Resolution Protocol (ARP) access control list (ACL), which is one of the steps implementing Dynamic ARP Inspection (DAI) on a VLAN.

### Syntax

**arp access-list** *acl-name*

**no arp access-list** *acl-name*

### Command Default

No ARP ACLs are defined.

### Parameters

*acl-name*

Specifies the name of the ARP ACL. The name can be up to 63 characters in length, and must begin with an alphanumeric character. No special characters are allowed, except for the underscore (\_) and hyphen (-).

### Modes

Global configuration mode

Interface subtype configuration mode

### Usage Guidelines

On untrusted interfaces of DAI-enabled VLANs, incoming ARP packets from permitted IP/MAC addresses are accepted only if all of the following steps were performed:

- Create the ACL, using the **arp access-list** command.
- In the ACL, create one or more rules, using the **permit ip host** command. Each rule specifies an IP/MAC address-pair.
- Apply the ACL to one or more VLANs, using the **ip arp inspection filter** command.
- Enable DAI on such VLANs, using the **ip arp inspection** command.

You can also append the **permit ip host** command to the **arp access-list** command.

You also need ARP ACLs to implement ARP Guard on a physical or port-channel interface.

The **no** form of the command deletes the ARP ACL if the ACL is not applied on any VLAN or port.

### Examples

The following example creates an ARP ACL named "host2" and then defines one permit rule in that ACL.

```
device# configure terminal
device(config)# arp access-list host2
device(config-arp-acl)# permit ip host 1.1.1.1 mac host 0000.0011.0022
```

The following example creates an ARP ACL, creates **permit ip host** rules within, applies it to a VLAN, and enables Dynamic ARP Inspection (DAI) on the VLAN.

```
device# configure terminal
device(config)# arp access-list arp_acl_1
device(config-arp-acl)# permit ip host 1.1.1.1 mac host 0020.2222.2222
device(config-arp-acl)# permit ip host 1.1.1.2 mac host 0020.2222.2223
device(config-arp-acl)# exit

device(config)# vlan 200
device(config-vlan-200)# ip arp inspection filter arp_acl_1
device(conf-vlan-200)# ip arp inspection
```

The following example creates an ARP ACL, creates **permit ip host** rules within, and applies it to an interface. This is the first stage of ARP Guard implementation.

```
device# configure terminal
device(config)# arp access-list arp_acl_2
device(config-arp-acl)# permit ip host 1.1.1.1 mac host 0020.2222.2222
device(config-arp-acl)# permit ip host 1.1.1.2 mac host 0020.2222.2223
device(config-arp-acl)# exit

device(config)# interface ethernet 1/2
device(conf-if-eth-1/2)# switchport
device(conf-if-eth-1/2)# ip arp inspection filter arp_acl_2
```

#### NOTE

At this point in the flow, ARP Guard is not yet enabled. For enablement details, refer to the "ARP Guard" section of the *Extreme SLX-OS Layer 3 Routing Configuration Guide for SLX 9540 and SLX 9850*.

## History

Release version	Command history
17r.1.00	This command was introduced.

# as-path-ignore

Disables the comparison of the autonomous system (AS) path lengths of otherwise equal paths.

## Syntax

```
as-path-ignore
no as-path-ignore
```

## Command Default

The comparison of the AS path lengths of otherwise equal paths is enabled.

## Modes

BGP configuration mode

## Usage Guidelines

The **no** form of the command restores default behavior.

## Examples

The following example configures the device to always disable the comparison of AS path lengths.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# as-path-ignore
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# auth-check

Disables Intermediate System-to-Intermediate System (IS-IS) authentication checking globally.

## Syntax

```
auth-check { level-1 | level-2 } disable
no auth-check { level-1 | level-2 }
```

## Command Default

IS-IS authentication checking is enabled by default.

## Parameters

**level-1**  
Specifies Level 1 packets only.

**level-2**  
Specifies Level 2 packets only.

**disable**  
Disables authentication checking.

## Modes

IS-IS router configuration mode

## Usage Guidelines

The **no** form of the command re-enables IS-IS authentication checking globally

## Examples

The following example disables IS-IS authentication checking for Level 1 packets.

```
device# configure terminal
device(config)# router isis
device(config-isis-router)# auth-check level-1 disable
```

The following example re-enables IS-IS authentication checking for Level 1 packets.

```
device# configure terminal
device(config)# router isis
device(config-isis-router)# no auth-check level-1
```

The following example disables IS-IS authentication checking for Level 2 packets.

```
device# configure terminal
device(config)# router isis
device(config-isis-router)# auth-check level-2 disable
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# auth-key

Configures an authentication key for Intermediate System-to-Intermediate System (IS-IS) globally.

## Syntax

```
auth-key { level-1 | level-2 } string
no auth-key { level-1 | level-2 }
```

## Command Default

No authentication key is configured.

## Parameters

### level-1

Specifies Level 1 packets only.

### level-2

Specifies Level 2 packets only.

### string

Specifies a text string that is used as an authentication password. The string can be from 1 through 63 ASCII characters in length.

## Modes

IS-IS router configuration mode

## Usage Guidelines

The authentication mode must be configured using the **auth-mode** command before an authentication password can be configured. If the authentication mode is reset for the level specified, the authentication key must also be reset.

The **no** form of the command removes the IS-IS authentication key.

## Examples

The following example configures an authentication key for Level 1 packets.

```
device# configure terminal
device(config)# router isis
device(config-isis-router)# auth-key level-1 mykey
```

The following example configures an authentication key for Level 2 packets.

```
device# configure terminal
device(config)# router isis
device(config-isis-router)# auth-key level-2 mysecurekey
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# auth-mode

Specifies the type of authentication used in Intermediate System-to-Intermediate System (IS-IS) packets globally.

## Syntax

```
auth-mode md5 { level-1 | level-2 }  
no auth-mode md5 { level-1 | level-2 }
```

## Command Default

Disabled.

## Parameters

**md5**  
Specifies Message Digest 5 (MD5) authentication.

**level-1**  
Specifies Level 1 packets only.

**level-2**  
Specifies Level 2 packets only.

## Modes

IS-IS router configuration mode

## Usage Guidelines

The **no** form of the command removes the configured authentication mode. The authentication key must be removed using the **no auth-key** command before removing the configured authentication mode. If the authentication mode is reset for the level specified, the authentication key must also be reset.

## Examples

The following example specifies that MD5 authentication is performed on Level 1 packets.

```
device# configure terminal  
device(config)# router isis  
device(config-isis-router)# auth-mode md5 level-1
```

The following example specifies that MD5 authentication is performed on Level 2 packets.

```
device# configure terminal  
device(config)# router isis  
device(config-isis-router)# auth-mode md5 level-2
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# auth-port

Configures a user datagram protocol (UDP) port for Remote Authentication Dial-In User Service (RADIUS) server authentication.

## Syntax

`auth-port portnum`

`no auth-port`

## Command Default

By default, port 1812 is used for RADIUS server authentication.

## Parameters

*portnum*

Specifies the UDP port to use for RADIUS server authentication. The valid range is 0 through 65535. The default port is 1812.

## Modes

RADIUS server host VRF configuration mode

## Usage Guidelines

The **no** form of the command restores the command default value.

## Examples

The following example shows how to configure port 1234 as the port used for connection to the RADIUS server for authentication.

```
device# configure terminal
device(config)# radius-server host 10.37.73.180 use-vrf green-vrf
device(config-host-10.37.73.180/green-vrf)# auth-port 1234
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# autobw-threshold table

Changes the parser mode to the config-router-mpls-autobw-threshold-table mode, allowing the user to change the absolute adjustment threshold values.

## Syntax

**autobw-threshold-table**

**no autobw-threshold-table**

## Command Default

There are no entries in the adjustment-threshold table.

## Modes

MPLS configuration mode.

## Usage Guidelines

The **no** function of the command clears all the entries in the adjustment-threshold table.

## Examples

The following example configures the autobw-threshold table

```
device>configure
device(config)# router mpls
device(config-router-mpls)# autobw-threshold-table
device(config-mpls-autobw-threshold-table)# bandwidth-ceiling 10 threshold 2000
device(config-mpls-autobw-threshold-table)# bandwidth-ceiling 1000 threshold 3000
device(config-mpls-autobw-threshold-table)# bandwidth-ceiling 10000 threshold 5000
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# auto-cost reference-bandwidth (OSPFv2)

Configures reference bandwidth.

## Syntax

```
auto-cost reference-bandwidth { value | use-active-ports }
no auto-cost reference-bandwidth
```

## Command Default

Reference bandwidth is 100 Mbps.

## Parameters

*value*

Reference bandwidth in Mbps. Valid values range from 1 through 4294967.

**use-active-ports**

Specifies that any dynamic change in bandwidth immediately affects the cost of OSPF routes. This parameter enables cost calculation for currently active ports only.

## Modes

OSPF router configuration mode

OSPF router VRF configuration mode

## Usage Guidelines

Use this command to configure the cost of an interface that a device advertises to its OSPF neighbors. OSPF calculates the cost of a route as the ratio of the reference bandwidth to the bandwidth of the egress interface. An increase in the reference bandwidth results in an increased cost. If the resulting cost is less than 1, the software rounds the cost up to 1.

The bandwidth for interfaces that consist of more than one physical port is calculated as follows:

- LAG group — The combined bandwidth of all the ports.
- Virtual interface — The combined bandwidth of all the ports in the port-based VLAN that contains the virtual interface.

If a change to the reference bandwidth results in a cost change to an interface, the device sends a link-state update to update the costs of interfaces advertised by the device.

### NOTE

If you specify the cost for an individual interface (by using the **ip ospf cost** command), the cost you specify overrides the cost calculated by the software.

The **no** form of the command disables bandwidth configuration.

## Examples

The following example configures a reference bandwidth of 500.

```
device# configure terminal
device(config)# router ospf
device(config-router-ospf-vrf-default-vrf)# auto-cost reference-bandwidth 500
```

The reference bandwidth specified in this example results in the following costs:

- 10 Mbps port's cost =  $500/10 = 50$ .
- 100 Mbps port's cost =  $500/100 = 5$ .
- 1000 Mbps port's cost =  $500/1000 = 0.5$ , which is rounded up to 1.

The costs for 10 Mbps and 100 Mbps ports change as a result of the changed reference bandwidth. Costs for higher-speed interfaces remain the same.

## History

Release version	Command history
16r.1.00	This command was introduced.

# auto-cost reference-bandwidth (OSPFv3)

Configures reference bandwidth.

## Syntax

```
auto-cost reference-bandwidth value  
no auto-cost reference-bandwidth
```

## Command Default

Reference bandwidth is 100 Mbps.

## Parameters

*value*

Reference bandwidth in Mbps. Valid values range from 1 through 4294967. The default is 100 Mbps.

## Modes

OSPFv3 router configuration mode  
OSPFv3 router VRF configuration mode

## Usage Guidelines

Use this command to configure the cost of an interface that a device advertises to its OSPF neighbors. OSPFv3 calculates the cost of a route as the ratio of the reference bandwidth to the bandwidth of the egress interface. An increase in the reference bandwidth results in an increased cost. If the resulting cost is less than 1, the software rounds the cost up to 1.

The bandwidth for interfaces that consist of more than one physical port is calculated as follows:

- LAG group — The combined bandwidth of all the ports.
- Virtual interface — The combined bandwidth of all the ports in the port-based VLAN that contains the virtual interface.

If a change to the reference bandwidth results in a cost change to an interface, the device sends a link-state update to update the costs of interfaces advertised by the device.

### NOTE

If you specify the cost for an individual interface using the **ipv6 ospf cost** command, the cost you specify overrides the cost calculated by the software.

The **no** form of the command restores the reference bandwidth to its default value and, thus, restores the default costs of the interfaces to their default values.

## Examples

The following example configures a reference bandwidth of 500.

```
device# configure terminal
device(config)# ipv6 router ospf
device(config-ipv6-router-ospf-vrf-default-vrf)# auto-cost reference-bandwidth 500
```

The reference bandwidth specified in this example results in the following costs:

- 10 Mbps port's cost =  $500/10 = 50$ .
- 100 Mbps port's cost =  $500/100 = 5$ .
- 1000 Mbps port's cost =  $500/1000 = 0.5$ , which is rounded up to 1.
- 155 Mbps port cost =  $500/155 = 3.23$ , which is rounded up to 4
- 622 Mbps port cost =  $500/622 = 0.80$ , which is rounded up to 1
- 2488 Mbps port cost =  $500/2488 = 0.20$ , which is rounded up to 1

The costs for 10 Mbps, 100 Mbps, and 155 Mbps ports change as a result of the changed reference bandwidth. Costs for higher-speed interfaces remain the same.

## History

Release version	Command history
16r.1.00	This command was introduced.



# auto-shutdown-new-neighbors

Disables the establishment of BGP connections with a remote peer when the peer is first configured.

## Syntax

`auto-shutdown-new-neighbors`

`no auto-shutdown-new-neighbors`

## Command Default

This feature is disabled.

## Modes

BGP configuration mode

## Usage Guidelines

The `auto-shutdown-new-neighbors` command applies to all neighbors configured under each VRF. When the `auto-shutdown-new-neighbors` command is used, any new neighbor configured will have the shutdown flag enabled for them by default. Once all the neighbor parameters are configured and it is ready to start the establishment of BGP session with the remote peer, the BGP neighbor's shutdown parameter has to disabled by removing the shutdown command for the neighbor.

The `no` form of the command restores the default.

## Examples

The following example enables auto shutdown of BGP neighbors on initial configuration.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# auto-shutdown-new-neighbors
```

The following example disables the peer shutdown state and begins the BGP4 session establishment process.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# local-as 65520
device(config-bgp-router)# no neighbor 10.1.1.1 shutdown
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# backup-advertisement-interval

Configures the interval at which backup VRRP routers advertise their existence to the master router.

## Syntax

`backup-advertisement-interval interval`

## Command Default

The default backup advertisement-interval is 60 seconds.

## Parameters

*interval*

Interval at which a backup VRRP router advertises its existence to the master router. Valid values range from 60 through 3600 seconds.

## Modes

Virtual-router-group configuration mode

## Usage Guidelines

The interval is the length of time, in seconds, between each advertisement sent from the backup routers to the master router. The advertisement notifies the master router that the backup is still active. If the master router does not receive an advertisement from the backup in a designated amount of time, the backup with the highest priority can assume the role of master.

This command can be used for either VRRP or VRRP-E.

## Examples

To set the backup advertisement interval to 120 seconds for VRRP-E group 10:

```
device# configure terminal
device(config)# interface ve 25
device(config-ve-25)# vrrp-extended-group 10
device(config-vrrp-extended-group-10)# backup-advertisement-interval 120
```

## History

Release version	Command history
16r.1.00	This command was introduced.

## bandwidth-ceiling

This command adds a new threshold change point to the autobw-threshold table. When the change point is already there, the threshold value updates to the new value.

### Syntax

```
bandwidth-ceiling [ bw in kbps | max-bw-threshold [ threshold _n_kbps | [ percentage threshold_percentage ] ]
no bandwidth-ceiling
```

### Command Default

There are no bandwidth ceiling entry.

### Parameters

*bw\_in\_kbps*

The bandwidth in kilobytes per second. 0 - 0x7FFFFFFF. Range of bandwidth in kbps.

**max-bw-threshold** *threshold \_in\_kbps*

The threshold in kilobytes per second. 0 - 0x7FFFFFFF. Range of bandwidth in kbps.

**threshold** *threshold\_percentage*

The threshold percentage per second. 0 - 100%. By default, the last ceiling is used.

#### NOTE

The first parameter indicates that any rate above the maximum ceiling configured. The second parameter is the threshold in kbps. for those rates.

### Modes

MPLS global adjustment threshold configuration mode.

### Usage Guidelines

Review the updated global adjustment-threshold table after executing this command.

The **max** keyword sets the threshold for any traffic-rate above the maximum bandwidth-ceiling configured in the table.

The **no** function of the command remove the bandwidth ceiling entry from the table.

### Examples

The following example configures the bandwidth ceiling maximum threshold percentage to 10.

```
device>configure
device(config)# router mpls
device(config-router-mpls)# autobw-threshold-table
device(config-router-mpls-autobw-threshold-table)# max threshold percentage 10
```

Release version	Command history
16r.1.00	This command was introduced.
17r.1.00	This command was modified from the option <b>maximum threshold</b> to max-bw-threshold.

# banner

Defines an incoming, login, or message of the day banner.

## Syntax

```
banner { incoming | login | motd } string
no banner incoming | login | motd
```

## Parameters

### incoming

Sets the incoming terminal line banner that is displayed on the console when a user establishes a Telnet session.

### login

Sets the login banner that is displayed on the user terminal when the user logs into the device.

### motd

Sets the message of the day (MOTD) that is displayed on the user terminal when a Telnet CLI session is established.

### *string*

Specifies a text string from 1 through 2048 characters in length including spaces.

## Modes

Global configuration mode.

## Usage Guidelines

Use the **no** form of the command to delete the banner.

The banner can appear on multiple lines if you enter multiline mode by using **Esc-M** and exit by using **CTRL-D**.

## Examples

To create a login banner with a single line:

```
device(config)# banner login "Please do not disturb the setup on this switch"
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# beacon enable

Configures Beacon LED based on chassis or based on interface/port-channel.

## Syntax

```
beacon enable chassis [ length length | start start-time ]
```

```
beacon enable interface { ethernet {slot/port [ length length start start-time ]} | { port-channel port-channel id}}
```

## Parameters

*length*

Specifies the duration in minutes. The range can be an integer in the range 1 to 1440.

*start-time*

Specifies the start time in the format (CCYY-MM-DDTHH:MM:SS). Date and time are separated by a delimiter T.

*port-channel*

Specifies the port channel ID.

## Modes

Privileged EXEC mode

## Usage Guidelines

For the configuration based on chassis, all the interfaces on all the line cards of the chassis will blink at rate of 1 blink /second. For the configuration based on interface or port-channel, only the specific ethernet interface or the port-channel blinks at rate of 1 blink/second. RASLOG messages are displayed for both chassis beacon enable and disable.

## Examples

The following example configures the Beacon LED based on chassis.

```
device# beacon enable chassis ?
Possible completions:
  length  Duration in minutes
  start   Start time
  |       Output modifiers
<cr>
```

```
device# beacon enable chassis length ?
Possible completions:
  <Enter a valid integer, 1 .. 1440>
device# beacon enable chassis length 1 ?
Possible completions:
  start   Start time
  |       Output modifiers
<cr>
```

```
device# beacon enable chassis length 1 start ?
Possible completions:
  <dateTime (CCYY-MM-DDTHH:MM:SS)>
  Please note the delimiter T which is used to separate date and time
```

The following example configures the Beacon LED based on interface/port-channel. .

```
device# beacon enable interface ?
Possible completions:
  ethernet      Ethernet interface
  port-channel  Port-channel interface

device# beacon enable interface ethernet 0/1 ?
Possible completions:
  length      Duration in minutes
  start       Start time
  |           Output modifiers
<cr>

device# beacon enable interface port-channel ?
Possible completions:
  <port channel id>
```

The following example shows RASLOG messages for chassis beacon enable and disable.

```
device# 2017/01/09-19:32:00, [NSM-2071], 7549, DCE, INFO, SLX9540, Chassis beaconing is enabled
device# 2017/01/09-19:33:00, [NSM-2072], 7550, DCE, INFO, SLX9540, Chassis beaconing is disabled
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# bfd

Enables Bidirectional Forwarding Detection (BFD).

## Syntax

**bfd**

**no bfd**

## Modes

IS-IS router configuration mode

OSPF router configuration mode

OSPFv3 router configuration mode

OSPF router VRF configuration mode

OSPFv3 router VRF configuration mode

## Usage Guidelines

Use the **bfd** command in IS-IS router configuration mode to enable BFD sessions on all IS-IS interfaces on which BFD has been configured using the **isis bfd** command. Use the **bfd** command in OSPF router configuration mode to enable BFD sessions on all OSPFv2 interfaces on which BFD has been configured using the **ip ospf bfd** command. Use the **bfd** command in OSPFv3 router configuration mode to enable BFD sessions on all OSPFv3 interfaces on which BFD has been configured using the **ipv6 ospf bfd** command.

The **no** form of the command disables BFD globally.

## Examples

The following example enables BFD globally in IS-IS router configuration mode.

```
device# configure terminal
device(config)# router isis
device(config-isis-router)# bfd
```

The following example enables BFD globally in OSPF router configuration mode.

```
device# configure terminal
device(config)# router ospf
device(config-router-ospf-vrf-default-vrf)# bfd
```

The following example disables BFD globally in OSPFv3 router configuration mode.

```
device# configure terminal
device(config)# ipv6 router ospf
device(config-ipv6-router-ospf-vrf-default-vrf)# no bfd
```



## History

Release version	Command history
17r.1.01	This command was introduced.

# bfd holdover-interval

Sets the time interval for which Open Shortest Path First (OSPF), Intermediate System to Intermediate System (IS-IS), or Border Gateway Protocol (BGP) routes are withdrawn after a Bidirectional Forwarding Detection (BFD) session is declared down.

## Syntax

```
bfd holdover-interval time
```

```
no bfd holdover-interval time
```

## Command Default

The BFD holdover interval is set to 0 by default.

## Parameters

*time*

Specifies the BFD holdover interval in seconds. In BGP configuration mode, valid values range from 0 through 30 and the default is 0. In IS-IS router configuration mode, OSPF router VRF and OSPFv3 router VRF configuration mode, valid values range from 0 through 20 and the default is 0.

## Modes

BGP configuration mode

IS-IS router configuration mode

OSPF router configuration mode

OSPFv3 router configuration mode

OSPF router VRF configuration mode

OSPFv3 router VRF configuration mode

## Usage Guidelines

The BFD holdover interval is supported for both single-hop and multihop sessions.

In BGP configuration mode, use this command to set the BFD holdover interval globally for BGP. In OSPF router configuration mode or OSPF router VRF configuration mode, use this command to set the BFD holdover interval globally for OSPFv2. In OSPFv3 router or OSPFv3 router VRF configuration mode, use this command to set the BFD holdover interval globally for OSPFv3. In IS-IS router configuration mode, use this command to set the BFD holdover interval globally for IS-IS.

The **no** form of the command removes the configured BFD holdover interval from the configuration, and reverts to the default value of 0.

## Examples

The following example sets the BFD holdover interval globally to 15 in BGP configuration mode.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# bfd holdover-interval 15
```

The following example sets the BFD holdover interval globally to 12 in OSPF router configuration mode.

```
device# configure terminal
device(config)# router ospf
device(config-router-ospf-vrf-default-vrf)# bfd holdover-interval 12
```

The following example sets the BFD holdover interval globally to 20 in OSPFv3 router configuration mode.

```
device# configure terminal
device(config)# ipv6 router ospf
device(config-ipv6-router-ospf-vrf-default-vrf)# bfd holdover-interval 20
```

The following example sets the BFD holdover interval globally to 12 in IS-IS router configuration mode.

```
device# configure terminal
device(config)# router isis
device(config-isis-router)# bfd holdover-interval 12
```

## History

Release version	Command history
17r.1.01	This command was introduced.

# bfd interval

Configures Bidirectional Forwarding Detection (BFD) session parameters on an interface.

## Syntax

**bfd interval** *transmit-time* **min-rx** *receive-time* **multiplier** *number*

**no bfd interval** *transmit-time* **min-rx** *receive-time* **multiplier** *number*

## Parameters

*transmit-time*

Specifies the interval, in milliseconds, a device waits to send a control packet to BFD peers. In interface subtype configuration mode and BGP configuration mode, valid values range from 50 through 30000. The default is 200 for chassis platforms. The default is 500 for non-chassis platforms.

**min-rx** *receive-time*

Specifies the interval, in milliseconds, a device waits to receive a control packet from BFD peers. In interface subtype configuration mode and BGP configuration mode, valid values range from 50 through 30000. The default is 200 for chassis platforms. The default is 500 for non-chassis platforms.

**multiplier** *number*

Specifies the number of consecutive BFD control packets that must be missed from a BFD peer before BFD determines that the connection to that peer is not operational. Valid values range from 3 through 50. The default is 3.

## Modes

BGP configuration mode

Interface subtype configuration mode

## Usage Guidelines

The *transmit-time* and **min-rx** *receive-time* parameters are the intervals desired by the local device. The actual values in use will be the negotiated values.

Use the **bfd interval** command in BGP configuration mode for multihop sessions only. Multihop sessions in BGP use either the values configured at the interface level using the **bfd interval** command or the default interval values.

The **no** form of the command reverts to the default parameters.

## Examples

The following example sets the BFD session parameters globally for an Ethernet interface.

```
device# configure terminal
device(config)# interface ethernet 1/4
device(config-if-eth-1/4)# bfd interval 100 min-rx 100 multiplier 10
```

The following example sets the BFD session parameters globally for a virtual Ethernet (VE) interface.

```
device# configure terminal
device(config)# interface ve 24
device(config-if-ve-24)# bfd interval 120 min-rx 150 multiplier 8
```

The following example sets the BFD session parameters globally for BGP.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# bfd interval 140 min-rx 125 multiplier 44
```

## History

Release version	Command history
17r.1.01	This command was introduced.

# bfd shutdown

Disables Bidirectional Forwarding Detection (BFD) on an interface.

## Syntax

**bfd shutdown**

**no bfd shutdown**

## Modes

Interface subtype configuration mode

## Usage Guidelines

The **no** form of the command re-enables BFD sessions.

## Examples

The following example disables BFD sessions on a specific Ethernet interface.

```
device# configure terminal
device(config)# interface ethernet 1/4
device(config-if-eth-1/4)# bfd shutdown
```

The following example disables BFD sessions on a specific virtual Ethernet (VE) interface.

```
device# configure terminal
device(config)# interface ve 24
device(config-if-ve-24)# bfd shutdown
```

## History

Release version	Command history
17r.1.01	This command was introduced.

# bgp-redistribute-internal

Causes the device to allow the redistribution of IBGP routes from BGP into OSPF for non-default VRF instances.

## Syntax

```
bgp-redistribute-internal
no bgp-redistribute-internal
```

## Command Default

This feature is disabled.

## Modes

```
BGP address-family IPv4 unicast configuration mode
BGP address-family IPv6 unicast configuration mode
BGP address-family IPv4 unicast VRF configuration mode
BGP address-family IPv6 unicast VRF configuration mode
```

## Usage Guidelines

Use the **no** form of the command to restore the defaults.

By default, with default VRF instances, the device does not allow the redistribution of IBGP routes from BGP4 and BGP4+ into OSPF. This helps to eliminate routing loops. In non-default VRF instances, use this command to allow the redistribution of IBGP routes from BGP into OSPF. This command is enabled only if a non-default VRF instance has been specified.

## Examples

This example enables BGP4 route redistribution.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv4 unicast
device(config-bgp-ipv4u)# bgp-redistribute-internal
```

This example enables BGP4+ route redistribution for VRF instance "red".

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv6 unicast vrf red
device(config-bgp-ipv6u-vrf)# bgp-redistribute-internal
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# bpdudropenable

Enables dropping Layer 2 (L2) bridge protocol data units (BPDUs) on endpoints in a bridge domain.

## Syntax

**bpdudropenable**

**no bpdudropenable**

## Command Default

Dropping of L2 BPDUs is disabled. L2 BPDUs are allowed on endpoints in the bridge domain.

## Modes

Bridge-domain configuration mode.

## Usage Guidelines

The **no** form of the command disables dropping of Layer 2 (L2) bridge protocol data units (BPDUs) in a bridge domain.

## Examples

The following example shows how to enable dropping of L2 BPDUs in bridge domain 3.

```
device# configure terminal
device(config)# bridge-domain 3
device(config-bridge-domain-3)# bpdudropenable
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# breakout mode 4x10g

Configures any 40G port on the SLX 9850 36X100G line card (LC) as four 10G ports.

## Syntax

`breakout mode 4x10g`

`no breakout mode 4x10g`

## Modes

Hardware connector configuration mode

## Usage Guidelines

Use the **no** form of the command to reset the port on the 36X100G LC to a 40G port.

You must power off the line card before using this command.

After using this command, save the running-config file to the startup-config file, and power on the line card or reload the device for the changes to take effect.

When you power on the line card, the SFP interfaces come up under the new mode with default configurations. Unaffected interfaces retain the configurations they had before the line card was powered off.

## Examples

The following example shows the configuration of a 40G port on the 36X100G LC into four 10G ports.

```
device# power-off linecard 4
device# configure terminal
device(config)# hardware
device(config-hardware)# connector 4/2
device(config-connector-4/2)# breakout mode 4x10g
%Warning: Sfp Breakout is a disruptive command.
Please save the running-config to startup-config and use reload command on the device or power-cycle
linecard on Chassis system for the changes to take effect.
device(config-port-group-4/2)# Ctrl-z
device# copy running-config startup-config
This operation will modify your startup configuration. Do you want to continue? [Y/N]: y
device# power-on linecard 4
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# bridge-domain (EVPN default instance)

Specifies a bridge domain (BD), or adds or removes a range VLANs from the BD, for an Ethernet Virtual Private Network (EVPN) default instance.

## Syntax

**bridge-domain** *BD-ID*

**no bridge-domain** *BD-ID*

**bridge-domain** { **add** | **remove** } {*VLAN-range* }

## Command Default

Disabled

## Parameters

*BD-ID*

Specifies a BD.

**add**

Adds a range of VLANs to the BD for default EVPN instance.

**remove**

Removes a range of BDs from the BD for the default EVPN instance.

*VLAN-range*

Specifies a hyphen-delimited VLAN range to be added to or removed from BD for the EVPN instance.

## Modes

EVPN default instance configuration mode

## Usage Guidelines

Each VLAN/BD added to an EVPN configuration is considered as an EVPN instance and is assigned a unique EVPN instance ID (EVI) internally. The EVI is calculated as shown in the following table.

**TABLE 2** Calculating EVI values from VLAN/BD values

VLAN/BD	EVI value
VLAN: 1-4096	VLAN ID
BD: 1-4096	BD ID + 4096

### ATTENTION

To interoperate with third-party vendors, the RTs across the interoperating devices must be the same. If third-party devices do not support automatic RT assignment, or the EVIs are not calculated as shown in the above table, the VLAN/BD instances must be configured manually to ensure that RTs across the devices are compatible.

## Examples

To specify a BD and enter BD configuration mode:

```
device# configure terminal
device(config)# evpn
device(config-evpn-default)# bridge-domain 100
device(config-bridge-domain-100)#
```

To add BDs 100 through 200 to the default EVPN instance:

```
device# configure terminal
device(config)# evpn
device(config-evpn-default)# bridge-domain add 100-200
```

To remove BDs 150 through 180 from the default EVPN instance:

```
device# configure terminal
device(config)# evpn
device(config-evpn-default)# bridge-domain remove 150-180
```

## History

Release version	Command history
17r.1.01	This command was introduced.

# bridge-domain

Creates a bridge domain. A bridge domain represents a switching or inter-connection domain for a wide range of service end-point types.

## Syntax

```
bridge-domain { id } [ p2mp | p2p ]
no bridge-domain { id } [ p2mp | p2p ]
```

## Command Default

No bridge domain is configured.

## Parameters

*id*  
Specifies a unique numeric bridge-domain identifier. The range is from 1 through 4096.

**p2mp**  
Specifies a multipoint service type. This is the default service type.

**p2p**  
Specifies a point-to-point cross-connect service type.

## Modes

Global configuration mode.

## Usage Guidelines

VPLS performs any-to-any switching between Ethernet attachment circuits (ACs) and MPLS pseudowires (PWs). VLL performs one-to-one switching between Ethernet AC and MPLS PWs. Use the bridge-domain to specify the related configuration for both VPLS and VLL.

The **no** version of the command removes the bridge-domain configuration.

## Examples

The following example shows how to configure bridge domain 1 and specifies a point-to-point cross-connect service for the domain.

```
device# configure terminal
device(config)# bridge-domain 1 p2p
```

The following example shows the error message that is displayed when the specified bridge-domain ID is out of range.

```
device# configure terminal
device(config)# bridge-domain 10000000
Error: syntax error: "10000000" is out of range.
```

The following example shows the error message that is displayed when the bridge-domain creation is not successful in the back-end.

```
device# configure terminal
device(config)# bridge-domain 110
Error: bridge-domain: connection instance creation failed.
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# bridge-priority

Specifies the bridge priority for the common instance.

## Syntax

**bridge-priority** *priority*

**no bridge-priority**

## Command Default

The default priority is 32768.

## Parameters

*priority*

Specifies the bridge priority. Valid values range from 0 through 61440 in increments of 4096.

## Modes

Protocol Spanning Tree mode

## Usage Guidelines

The priority values can be set only in increments of 4096.

Using a lower priority value indicates that the bridge might become root.

Enter **no bridge-priority** to return to the default priority.

## Examples

To specify the bridge priority:

```
device# configure terminal
device(config)# protocol spanning-tree stp
device(conf-stp)# bridge-priority 8192
```

```
device# configure terminal
device(config)# protocol spanning-tree rstp
device(conf-rstp)# bridge-priority 8192
```

```
device# configure terminal
device(config)# protocol spanning-tree mstp
device(conf-mstp)# bridge-priority 8192
```

## History

Release version	Command history
16r.1.00	This command was introduced.

## bsr-candidate

Configures a bootstrap router (BSR) as a candidate to distribute rendezvous point (RP) information to the other PIM Sparse devices within a PIM Sparse domain.

### Syntax

```
bsr-candidate interface [ ethernet | loopback | port-channel | ve ]
no bsr-candidate
```

### Command Default

The PIM router does not participate in BSR election.

### Parameters

**loopback** *num*  
Specifies the loopback interface for the candidate BSR.

**ve** *num*  
Specifies the virtual interface for the candidate BSR.

**port-channel** *num*  
Specifies the port-channel number for the candidate BSR.

### Modes

PIM Router configuration mode

### Usage Guidelines

The **no** form of this command makes the PIM router cease to act as a candidate BSR.

Each PIM Sparse domain has one active BSR. For redundancy, you can configure ports on multiple devices as candidate BSRs. The PIM Sparse protocol uses an election process to select one of the candidate BSRs as the BSR for the domain. The BSR with the highest BSR priority is elected. If the priorities result in a tie, the candidate BSR interface with the highest IP address is elected.

Although you can configure the device as only a candidate BSR or an RP, it is recommended that you configure the same interface on the same device as both a BSR and an RP.

### Examples

The following example uses a physical interface to configure a device as a candidate BSR.

```
device(config)# router pim
device(config-pim-router)# bsr-candidate ethernet 2/2 30 255
```



The following example uses a loopback interface to configure a device as a candidate BSR.

```
device(config)# router pim
device(config-pim-router)# bsr-candidate interface loopback 11 mask 32
```

The following example uses a virtual interface to configure a device as a candidate BSR.

```
device(config)# router pim
device(config-pim-router)# bsr-candidate ve 120 30 250
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# bypass-lsp

Creates a bypass LSP by using the **bypass-lsp** command. Thereafter, in the bypass LSP context, you must specify at least one interface as an excluded or protected interface.

## Syntax

```
bypass-lsp { name }
no bypass-lsp { name }
```

## Parameters

*name*  
Specifies the name of the target LSP.

## Modes

MPLS router configuration mode

## Usage Guidelines

The *name* variable must be unique among all regular LSPs and bypass LSPs. .

The **no** form of the command deletes the bypass LSP from the system.

## Examples

The following example selects the *xm4-by* LSP as a bypass LSP.

```
device>configure
device(config)# router mpls
device(config-router-mpls)# bypass-lsp xm4-by
device(config-router-mpls-bypasslsp-xm4-by)#
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# Commands C - D

---

## capability as4-enable

Enables 4-byte autonomous system number (ASN) capability at the BGP global level.

### Syntax

`capability as4-enable`

`no capability`

### Command Default

This feature is disabled.

### Modes

BGP configuration mode

### Usage Guidelines

Use the **no** form of this command to disable this functionality.

### Examples

The following example enables 4-byte ASN capability.

```
device#configure terminal
device(config)# router bgp
device(config-bgp-router)# capability as4-enable
```

### History

Release version	Command history
16r.1.00	This command was introduced.

# ccm-interval

Sets the time interval between two successive Continuity Check Messages (CCMs) that are sent by MEPs in the specified Maintenance Association.

## Syntax

```
ccm-interval [1-second | 10-second | 3.3-ms | 10-ms | 100-ms ]
```

## Parameters

### 1-second

Sets the time interval between two successive CCM packets to 1 second.

### 10-second

Sets the time interval between two successive CCM packets to 10 seconds.

### 3.3-ms

Sets the time interval between two successive CCM packets to 3.3 milliseconds.

### 10-ms

Sets the time interval between two successive CCM packets to 10 milliseconds.

### 100-ms

Sets the time interval between two successive CCM packets to 100 milliseconds.

## Modes

CFM protocol configuration mode

## Usage Guidelines

The default value is 10 seconds.

## Examples

```
device(config-cfm-md-ma-mal) #ccm-interval 10-second
device(config-cfm-md-ma-mal) #
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# certutil import sshkey

Imports the SSH public key for an SSH user from the remote host using the mentioned login credentials and path name.

## Syntax

```
certutil import sshkey host remote_ip_address directory ssh_public_key_path user user_acct password password login
login_id
```

```
no certutil sshkey
```

## Parameters

**directory** *path*

Specifies the path to the certificate.

**file** *filename*

Specifies the SSH public key with a .pub extension.

**host** *remote\_ip*

Specifies the IP address of the remote host.

**login** *login\_id*

Specifies the login name in the remote host.

**password** *password*

Specifies the password to access the remote host.

**user** *user\_acct*

Specifies the user name to access the remote host.

## Modes

Privileged EXEC mode

## Usage Guidelines

Enter **no certutil sshkey user** to delete the SSH public key a specified user.

When using the 'pass' parameter with special characters (such as #,\$@`) use single or double-quotes around the password.

Alternatively, the special characters can be escaped with a backslash (\) preceding the special character.

## Examples

The following command deletes the SSH public key for "testuser."

```
device# no certutil sshkey user testuser
Do you want to delete the SSH public key file? [y/n]:y
device# 2012/11/11-13:46:05, [SEC-3050], 3295,, INFO, Event: sshutil, Status: success, Info: Deleted
SSH public keys associated to user 'testuser'.
```

The following command deletes the SSH public key for "testuser."

```
device# no certutil sshkey user testuser
Do you want to delete the SSH public key file? [y/n]:y
device# 2012/11/11-13:46:05, [SEC-3050], 3295,, INFO, Event: sshutil, Status: success, Info: Deleted
SSH public keys associated to user 'testuser'.
```

The following commands demonstrate the use of special characters in a password.

```
device# certutil import ssh host 192.168.10.10 dir /home/brcd1/.ssh file id_rsa.pub user admin login
brcd1 pass Abcde\!
device# certutil import ssh host 192.168.10.10 dir /home/brcd1/.ssh file id_rsa.pub user admin login
brcd1 pass "Abcde!"
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# cfm y1731 domain

Sets the on-demand two-way delay measurement or two-way synthetic loss measurement parameters.

## Syntax

```
cfm y1731 domain domain-name ma ma-name src-mep mep-id target-mep mep-id test-profile profile-name
```

## Parameters:

*domain-name*

Specifies the domain name.

**ma**

Specifies the maintenance association (MA).

*ma-name*

Specifies the MA name.

**src-mep** *mep-id*

Specifies the source mep-id.

**target** *mep-id*

Specifies the target mep-id.

**profile**

Specifies the default or configured test profile.

*profile-name*

Specifies the profile name.

## Modes

Global configuration mode

## Examples

This example shows how to run on-demand two-way delay measurement or two-way synthetic loss measurement parameters.

```
device# cfm y1731 domain mdl ma ma1 src-mep 1 target-mep 2 test-profile 2dm_default_profile
```

```
device# cfm y1731 domain mdl ma ma1 src-mep 1 target-mep 2 test-profile 2slm_default_profile
```

## History

Release version	Command history
17r.1.01	This command was introduced.

# cfm linktrace

Transmits a linktrace message to a Maintenance End Point (MEP) in the domain

## Syntax

```
cfm linktrace { domain name | ma ma-name | src-mep mep-id { target-mip HH:HH:HH:HH:HH:HH | target-mep mep-id }}
    timeout time | ttl tll-value
```

## Parameters

**domain** *name*

Specifies the maintenance domain to be used for a linktrace message. The name attribute is case-sensitive.

**ma** *ma-name*

Specifies the maintenance association to be used for a linktrace message. The ma-name attribute is case-sensitive.

**src-mep** *mep-id*

Specifies the Source ID. The range of valid values is from 1 through 8192.

**target-mip** *HH:HH:HH:HH:HH:HH*

Specifies the MAC address of the MIP linktrace destination.

**target-mep** *mep-id*

Specifies the destination ID. The range of valid values is from 1 through 8192.

**ttl** *tll-value*

specifies the initial TTL field value. The range of valid values is from 1 through 64.

**timeout** *time*

Specifies the timeout used to wait for linktrace reply in seconds.

## Modes

Privileged EXEC mode .

## Usage Guidelines

The **cfm linktrace** command sends a trace message to a specified MEP in the domain to diagnose the path of the MEP link.



## Examples

The following example transmits a successful trace from MEP 21 to MEP 1.

```
device# cfm linktrace domain md1 ma ma1 src-mep 21 target-mep 1 timeout 10

Linktrace to 000c.dbfb.5378 on Domain md1, level 4: timeout 10ms, 4 hops
-----
Hops      MAC          Ingress      Ingress Action  Relay Action
Forwarded Egress       Egress Action Nexthop
-----
1         000c.dbe2.6ea0          RLY_FDB
Forwarded      5/4          EgrOK
2         000c.dbfb.5378      7/2          IgrOK          RLY_HIT
Not Forwarded
Destination 000c.dbfb.5378 reached
```

## History

Release version	Command history
16r.1.01	This command was introduced.

# cfm loopback

Transmits a loopback message to a specific Maintenance End Point (MEP) or Maintenance Intermediate Point (MIP) in a specified domain.

## Syntax

```
cfm loopback { domain name | ma ma-name | src-mep mep-id { target-mip HH:HH:HH:HH:HH:HH | target-mep mep-id } |
  number value | timeout time
```

## Parameters

**domain** *name*

Specifies the maintenance domain to be used for a loopback message. The name attribute is case sensitive.

**ma** *ma-name*

Specifies the maintenance association to be used for a loopback message. The ma-name attribute is case-sensitive.

**src-mep** *mep-id*

Specifies the Source ID. The range of valid values is from 1 through 8192.

**target-mip** *HH:HH:HH:HH:HH:HH*

Specifies the MAC address of the MIP loopback destination.

**target-mep** *mep-id*

Specifies the destination ID. The range of valid values is from 1 through 8192.

**number** *value*

Specifies the number of loopback messages to be sent.

**timeout** *time*

Specifies the timeout used to wait for loopback reply in seconds.

## Modes

Privileged EXEC mode

## Usage Guidelines

The cfm loopback command sends a loopback message to a specific MEP or MIP in a specified domain for testing purposes.

## Examples

Command example sending a message from MEP 2 to MEP 1 a total of ten times.

```
device# cfm loopback domain md1 ma mal src-mep 2 target-mep 1 timeout 10 number 10

cfm: Sending 10 Loopback to 000c.dbfb.5378, timeout 10 msec
Type Control-c to abort
Reply from 000c.dbfb.5378: time=1ms
Reply from 000c.dbfb.5378: time<1ms
Reply from 000c.dbfb.5378: time<1ms
Reply from 000c.dbfb.5378: time<1ms
Reply from 000c.dbfb.5378: time<1ms
Reply from 000c.dbfb.5378: time<1ms
Reply from 000c.dbfb.5378: time<1ms
Reply from 000c.dbfb.5378: time<1ms
Reply from 000c.dbfb.5378: time<1ms
Reply from 000c.dbfb.5378: time<1ms
A total of 10 loopback replies received.
Success rate is 100 percent (10/10), round-trip min/avg/max=0/0/1 ms.
```

## History

Release version	Command history
16r.1.01	This command was introduced.

# channel-group

Enables Link Aggregation on an interface.

## Syntax

```
channel-group number mode { active | passive | on } [ type { standard | brocade } ]
no channel-group
```

## Command Default

The value for **type** is set to **standard**.

## Parameters

### *number*

Specifies a Link Aggregation Group (LAG) port channel-group number to which this link should administratively belong to. Valid values range from 1 through 6144.

### **mode**

Specifies the mode of Link Aggregation.

#### **active**

Enables the initiation of LACP negotiation on an interface.

#### **passive**

Disables LACP on an interface.

#### **on**

Enables static link aggregation on an interface.

### **type**

Specifies the type of LAG.

#### **standard**

Specifies the 802.3ad standard-based LAG.

#### **brocade**

Specifies the Extreme proprietary hardware-based trunking.

## Modes

Interface subtype configuration mode

## Usage Guidelines

This command adds an interface to a port-channel specified by the channel-group number. This command enables link aggregation on an interface, so that it may be selected for aggregation by the local system.

Only a maximum of 24 LAGs can be created. Be aware of the following:

- A maximum of four link aggregation groups can be created per device when the **type** is set to **brocade**.

- A maximum of four links can become part of a single aggregation group when the **type** is set to **brocade** and they must be on the same port-channel.
- Links 0 through 7 belong to port-channel 1; links 8 through 15 belong to port-channel 2, and links 16 through 23 belong to port-channel 3.
- For the **standard** type, a maximum of 16 links can be aggregated per aggregation group and they can be members of any port-channel.
- Enter **no channel-group** to remove the port-channel members.

## Examples

To set the channel-group number to 4 and the mode to *active* on a specific 10-gigabit Ethernet interface:

```
device# configure terminal
device(config)# interface ethernet 0/9
device(conf-if-eth-0/9)# channel-group 4 mode active
```

To set the channel-group number to 10, the mode to *passive*, and the type to *brocade* on a specific 1-gigabit Ethernet interface:

```
device# configure terminal
device(config)# interface ethernet 0/9
device(conf-if-eth-0/9)# channel-group 10 mode passive brocade
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# chassis

Sets the IPv4 or IPv6 address of a device chassis.

## Syntax

```
chassis { virtual-ip IPv4-address | virtual-ipv6 IPv6-address }  
no chassis
```

## Command Default

The default is the initial address of the device chassis.

## Parameters

**virtual-ip** *IPv4-address*

Sets an IPv4 address in dotted-decimal notation with a CIDR prefix (mask).

**virtual-ipv6** *IPv6-address*

Sets an IPv6 address in colon-separated hexadecimal notation with a CIDR prefix.

## Modes

Global configuration mode

## Usage Guidelines

This command changes the default chassis IPv4 or IPv6 address. The default is the initial address of the device chassis.

Use this command to change the IP address to facilitate management, for example, if a device is moved to a different subnet. The IP address of the management platform should be in the same subnet as the devices it manages.

Use the **no** form of this command to revert to the default address.

## Examples

IPv4:

```
device# configure terminal  
device(config)# chassis virtual-ip 10.11.12.13/20
```

IPv6:

```
device# configure terminal  
device(config)# chassis virtual-ipv6 2001:db8:8086:6502/64
```

# History

Release version	Command history
16r.1.00	This command was introduced.

# cisco-interopability

Configures the device to interoperate with some legacy Cisco switches.

## Syntax

```
cisco-interopability { disable | enable }
```

## Command Default

Cisco interoperability is disabled.

## Parameters

### disable

Disables Cisco interoperability for the Multiple Spanning Tree Protocol (MSTP) device.

### enable

Enables Cisco interoperability for the MSTP enabled device.

## Modes

Protocol Spanning Tree MSTP mode

## Usage Guidelines

For some devices, the MSTP field, Version 3 Length, does not adhere to the current standards.

If Cisco interoperability is required on any device in the network, then all devices in the network must be compatible, and therefore enabled using this command for interoperability with a Cisco switch.

## Examples

To enable Cisco interoperability on a device:

```
device# configure terminal
device(config)# protocol spanning-tree mstp
device(conf-mstp)# cisco-interopability enable
```

To disable Cisco interoperability on a device:

```
device# configure terminal
device(config)# protocol spanning-tree mstp
device(conf-mstp)# cisco-interopability disable
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# class

Creates a class map in a policy map and enters the class map configuration mode.

## Syntax

**class** *class-mapname*

**no class** *class-mapname*

## Command Default

A policy map is not created.

## Parameters

*class-mapname*

The designated name for the class map.

## Modes

Policy map configuration mode

## Usage Guidelines

Use this command to configure a class map for a police policy map with QoS and policing parameters for inbound or outbound traffic. The class map must be previously created and associated with match criteria using the **class-map** command. (Refer to the **qos cos** command.)

When you enter the **class** command and access policy-map class configuration mode, you can configure QoS and policing parameters for the class map using the commands for the specific parameters.

Each policy map can contain one class map.

The **police cir** command is mandatory for configuring a class map.

Enter **no police** while in config-policymap-class mode to remove all policing parameters for the class map.

Enter **no police** command followed by a policing parameter name to remove a specific parameter.

### NOTE

The **cir** is mandatory for configuring a class map. Other parameters are optional. If optional parameters are not set then they will be treated as disabled. To delete the mandatory CIR parameter, you must delete all policer parameters while in the policy map class configuration mode using the **no police** command.

class

## Examples

This example configures a class-map called "default" within a policy-map.

```
device# configure terminal
device(config)# policy-map policymap1
device(config-policymap)# class default
device(config-policymap-class)# police cir 40000
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# class-map

Enters class (classification) map configuration mode.

## Syntax

```
class-map class-map-name
```

```
no class-map class-map-name
```

## Command Default

The class map name "default" is reserved and cannot be created by users.

## Parameters

*class-map-name*

Name of classification map. The map name is restricted to 64 characters.

## Modes

Global configuration mode.

## Usage Guidelines

Enter **no map class-map***class-map-name* while in global configuration mode to remove the classification map.

You can create up to 128 class maps.

## Examples

To create a class map and place system into config-classmap mode:

```
device(config)# class-map default
device(config-classmap)#
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# clear arp

Clears some or all Address Resolution Protocol (ARP) entries.

## Syntax

```
clear arp [ ethernet slot / port | ip ip-address | ve ve-id ] [ no-refresh ] [ vrf vrf-name ]
```

## Parameters

### ethernet

Specifies a physical Ethernet interface.

#### slot

Specifies a valid slot number.

#### port

Specifies a valid port number.

### ip ip-address

Specifies a next-hop IP address.

### ve ve-id

Specifies a virtual Ethernet (VE) interface.

### no-refresh

Clears the ARP cache without resending ARP requests to the local hosts.

### vrf vrf-name

Specifies a VRF instance.

## Modes

Privileged EXEC mode

## Usage Guidelines

If the **no-refresh** keyword is not included, ARP requests are automatically triggered for the cleared entries. To avoid this triggering, include the **no-refresh** keyword. It is required to include the **no-refresh** keyword, in case the number of ARP entries reaches the system threshold

## Examples

The following example clears all ARP entries on the device.

```
device# clear arp
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# clear bfd neighbors

Clears Bidirectional Forwarding Detection (BFD) neighbors.

## Syntax

```
clear bfd neighbors [ ipv4-addr || ipv6-addr ]
```

## Parameters

*ipv4-addr*

Specifies an IPv4 address.

*ipv6-addr*

Specifies an IPv6 address.

## Modes

Privileged EXEC mode

## Examples

The following example clears a specified IPv4 BFD neighbor.

```
device# clear bfd neighbors 10.1.1.1
```

The following example clears all BFD neighbor.

```
device# clear bfd neighbors
```

## History

Release version	Command history
17r.1.01	This command was introduced.

# clear bgp evpn neighbor

Requests a dynamic refresh of BGP EVPN connections or routes from a neighbor, with a variety of options.

## Syntax

```
clear bgp evpn neighbor { all | ipv4-addr | ipv6-addr } [ soft [ in | out ] ]
clear bgp evpn neighbor { all | ipv4-addr | ipv6-addr } [ soft-outbound ]
```

## Parameters

### all

Resets and clears all BGP EVPN connections to all neighbors.

### ipv4-addr

Specifies an IPv4 address.

### ipv6-addr

Specifies an IPv6 address.

### soft

Refreshes routes received from or sent to the neighbor.

#### in

Refreshes received routes.

#### out

Refreshes sent routes.

### soft-outbound

Refreshes all outbound routes by applying new or changed filters, but sends only the existing routes affected by the new or changed filters to the neighbor.

### NOTE

Use **soft-outbound** only if the outbound policy is changed. This operand updates all outbound routes by applying the new or changed filters. However, the device sends to the neighbor only the existing routes that are affected by the new or changed filters. The **soft out** operand updates all outbound routes and then sends the entire route table on the device to the neighbor after the device changes or excludes the routes affected by the filters.

## Modes

Privileged EXEC mode

## Examples

This example refreshes all BGP EVPN neighbor connections.

```
device# clear bgp evpn neighbor all
```

This example clears BGP EVPN connections with a specified IPv6 address.

```
device# clear bgp evpn neighbor 2001::1
```

```
clear bgp evpn neighbor
```

This example refreshes routes received from a neighbor with the IP address 10.0.0.1.

```
device# clear bgp evpn neighbor 10.0.0.1 soft in
```

## History

Release version	Command history
17r.1.01	This command was introduced.



# clear bgp evpn routes

Clears routes from the BGP EVPN route table and resets the routes.

## Syntax

**clear bgp evpn routes**

**clear bgp evpn routes type arp** *ip address* **mac** *mac address* **ethernet-tag** *tag-id*

**clear bgp evpn routes type ipv4-prefix** *ip address/mask*

**clear bgp evpn routes type ipv6-prefix** *ipv6 address/mask*

**clear bgp evpn routes type mac** *mac address* **ethernet-tag** *tag-id*

**clear bgp evpn routes type nd** *IPv6 address* **mac** *mac address* **ethernet-tag** *tag-id*

## Parameters

**arp**

Specifies address-resolution protocol (ARP) routes.

*ip address*

Specifies an IP address.

**mac** *mac address*

Specifies Media Access Control (MAC) routes and a MAC address. The valid format is HHHH.HHHH.HHHH.

**ethernet-tag** *tag-id*

Specifies an Ethernet tag. Valid values range from 1 through 4294967295.

**ipv4-prefix**

Specifies IPv4 prefix routes.

*IPv4 address/mask*

Specifies an IPv4 address and mask.

**ipv6-prefix**

Specifies IPv6 prefix routes.

*IPv6 address/mask*

Specifies an IPv6 address and mask.

**mac**

Specifies MAC routes.

**nd**

Specifies neighbor-discovery (ND) routes.

## Modes

Privileged EXEC mode

clear bgp evpn routes

## Examples

This example clears all routes from the BGP EVPN route table.

```
device# clear bgp evpn routes
```

This example clears all ARP routes from the BGP EVPN route table.

```
device# clear bgp evpn routes type arp
```

This example clears a specified MAC route from the BGP EVPN route table.

```
device# clear bgp evpn routes type mac 000.abba.baba ethernet-tag 0
```

## History

Release version	Command history
17r.1.01	This command was introduced.

# clear cfm y1731 statistics

Clears all Y.1731 statistics.

## Syntax

```
clear cfm y1731 statistics
```

## Modes

Privileged EXEC mode

## Examples

This example shows how to clear all Y.1731 statistics.

```
device# clear cfm y1731 statistics
```

## History

Release version	Command history
17r.1.01	This command was introduced.

# clear cfm y1731 statistics delay-measurement

Clears all Y.1731 statistics for Two-Way ETH-DM.

## Syntax

```
clear cfm y1731 statistics delay-measurement
```

## Modes

Privileged EXEC mode

## Examples

This example shows how to clear all Y.1731 statistics for Two-Way ETH-DM.

```
device# clear cfm y1731 statistics delay-measurement
```

## History

Release version	Command history
17r.1.01	This command was introduced.

# clear cfm y1731 statistics synthetic-loss-measurement

Clears all Y.1731 statistics for Two-way ETH-SLM.

## Syntax

```
clear cfm y1731 statistics
```

## Modes

Privileged EXEC mode

## Examples

This example shows how to clear all Y.1731 statistics for Two-Way ETH-SLM.

```
device# clear cfm y1731 statistics
```

## History

Release version	Command history
17r.1.01	This command was introduced.

# clear counters

Clears the IP counter statistics on the switch.

## Syntax

```
clear counters [ access-list { ip | ipv6 | mac } [ all | interface { fcoe [ vn-number | all ] | port-channel number | slot-id number |  
vlan vlan_id } | storm-control ]
```

## Parameters

### access-list

Clears the IP counter statistics on all interfaces on the switch.

### all

Clears all IP counter statistics on the switch or selected interface.

### interface

Specifies an interface.

### port-channel *number*

Specifies a port-channel. The number of available channels range from 1 through 6144.

### slot-id

Clears the IP counter statistics on a specified slot in the chassis.

### storm-control

Clears counters about traffic controlled by configured rate limits.

## Modes

Privileged EXEC mode

# clear counters access-list

Clears access control list (ACL) statistical information for a given network protocol and inbound or outbound direction.

## Syntax

```
clear counters access-list interface { ethernet slot / port | port-channel index | vlan vlan-id } { in | out }
clear counters access-list interface ve vlan-id { in | out }
clear counters access-list { ip | ipv6 } [ acl-name { in | out } ]
clear counters access-list { ip | ipv6 } acl-name interface { ethernet slot / port | port-channel index | ve vlan-id } { in | out }
clear counters access-list receive { ip | ipv6 }
clear counters access-list mac [ acl-name { in | out } ]
clear counters access-list mac acl-name interface { ethernet slot / port | port-channel index | vlan vlan-id } { in | out }
```

## Parameters

### interface

Specifies an interface.

### ethernet

Specifies a physical Ethernet interface.

*slot*

Specifies a valid slot number.

*port*

Specifies a valid port number.

### port-channel *index*

Specifies a port-channel. Available channels range from 1 through 6144.

### in

Specifies incoming binding direction.

### out

Specifies outgoing binding direction.

### vlan *vlan-id*

(Available only on Layer 2) Specifies a VLAN.

### ve *vlan-id*

(Available only on Layer 3) Specifies a virtual Ethernet (VE) interface.

### ip

Specifies the IPv4 Layer 3 network protocol.

### ipv6

Specifies the IPv6 Layer 3 network protocol.

### mac

Specifies the medium access control (MAC) Layer 2 network protocol.

**receive**

Specifies an ACL that applies to device receive-path traffic.

*acl-name*

Specifies the ACL name. To clear statistics on all counters of an ACL-type, do not specify *acl-name*.

## Modes

Privileged EXEC mode

## Usage Guidelines

You can clear all statistics for a specified ACL or only for that ACL on a specified interface.

You can also clear statistical information for all ACLs bound to a specified Ethernet interface, a port-channel, VLAN, or VE.

## Examples

The following example clears ACL statistics on a specified Ethernet interface.

```
device# clear counters access-list interface ethernet 2/1
```

The following example clears ACL statistics for a specified MAC ACL on a specified Ethernet interface.

```
device# clear counters access-list mac MAC_ACL_1 interface ethernet 2/2
```

The following example clears ACL statistics for a specified MAC ACL on all interfaces on which this ACL is applied.

```
device# clear counters access-list mac MAC_ACL_1
```

The following example clears ACL statistics for a specified IPv4 ACL on a specified interface.

```
device# clear counters access-list ip IP_ACL_1 interface ethernet 2/3
```

The following example clears ACL statistics for a specified IPv4 ACL on all interfaces on which it is applied.

```
device# clear counters access-list ip IP_ACL_1
```

The following example clears incoming ACL statistics for a specified IPv6 ACL on a virtual Ethernet (VE) interface.

```
device# clear counters access-list ipv6 ip_acl_3 interface ve 10 in
```

The following example clears IPv6 receive-path ACL statistics.

```
device# clear counters access-list receive ipv6
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# clear counters access-list overlay type vxlan

Clears statistics of the specific overlay access list.

## Syntax

```
clears counters access-list overlay type vxlan user-acl-name
```

## Parameters

*user-acl-name*

The ACL name.

## Modes

Privileged EXEC mode.

## Examples

This example clears the statistics pertaining to the specified ACL.

```
device# clear counters access-list overlay type vxlan abc_ext
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# clear counters storm-control

Clears all broadcast, unknown unicast, and multicast (BUM) related counters in the system.

## Syntax

**clear counters storm-control**

**clear counters storm-control** [ **broadcast** | **multicast** | **unknown-unicast** ] [ **interface ethernet** *slot/port* ]

## Parameters

### **broadcast**

Clears all BUM-related counters in the system for the broadcast traffic type.

### **multicast**

Clears all BUM-related counters in the system for the multicast traffic type.

### **unknown-unicast**

Clears all BUM-related counters in the system for the unknown-unicast traffic type.

### **interface ethernet** *slot/port*

Clears all BUM-related counters in the system for the specified interface.

## Modes

Privileged EXEC mode.

## Usage Guidelines

This command clears the counters for broadcast, unknown-unicast, and multicast traffic for the entire system, for specified traffic types, for specified interfaces, or for specified traffic types on specified interfaces.

## Examples

Clear counters for broadcast traffic on an Ethernet interface.

```
device# clear counters storm-control broadcast interface ethernet 4/1
```

Clear counters for all traffic types enabled on an Ethernet interface.

```
device# clear counters storm-control interface ethernet 4/1
```

Clear counters for all multicast traffic in the system.

```
device# clear counters storm-control multicast
```

Clear all BUM-related counters in the system.

```
device# clear counters storm-control
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# clear dot1x statistics

Clears all accumulated dot1x port authentication statistics on the ports.

## Syntax

```
clear dot1x statistics [ interface ethernet slot/port ]
```

## Parameters

**interface ethernet slot/port**

Specifies to clear all dot1x statistics for a specified interface port.

## Modes

Privileged EXEC mode

## Examples

This example clears all accumulated dot1x port authentication statistics on all ports.

```
device# clear dot1x statistics
```

This example clears all dot1x statistics for a specified interface port.

```
device# clear dot1x statistics interface ethernet 1/1
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# clear ip bgp dampening

Reactivates suppressed BGP4 routes.

## Syntax

```
clear ip bgp dampening [ ip-addr { / mask } ] [ vrf vrf-name ]
```

## Parameters

*ip-addr*

IPv4 address of a specified route in dotted-decimal notation.

*mask*

(Optional) IPv4 mask of a specified route in CIDR notation.

**vrf** *vrf-name*

Specifies the name of a VRF instance.

## Modes

Privileged EXEC mode

## Examples

This example unsuppresses all suppressed BGP4 routes.

```
device# clear ip bgp dampening
```

This example unsuppresses suppressed BGP4 routes for VRF "red".

```
device# clear ip bgp dampening vrf red
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# clear ip bgp flap-statistics

Clears the dampening statistics for a BGP4 route without changing the dampening status of the route.

## Syntax

```
clear ip bgp flap-statistics [ ip-addr { / mask } ] neighbor ip-addr | regular-expression string ] [ vrf vrf-name ]
```

## Parameters

*ip-addr*

IPv4 address of a specified route in dotted-decimal notation.

*mask*

(Optional) IPv4 mask of a specified route in CIDR notation.

**neighbor**

Clears dampening statistics only for routes learned from the specified neighbor.

*ip-addr*

IPv4 address of the neighbor.

**regular-expression**

Specifies a regular expression.

*string*

Regular expression.

**vrf vrf-name**

Specifies the name of a VRF instance.

## Modes

Privileged EXEC mode

## Examples

This example clears the dampening statistics for a BGP4 route.

```
device# clear ip bgp flap-statistics 10.0.0.0/16
```

This example clears the dampening statistics for a BGP4 route for VRF "red".

```
device# clear ip bgp flap-statistics 10.0.0.0/16 vrf red
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# clear ip bgp local routes

Clears BGP4 local routes from the IP route table and resets the routes.

## Syntax

```
clear ip bgp local routes [ vrf vrf-name ]
```

## Parameters

**vrf** *vrf-name*

Specifies the name of a VRF instance.

## Modes

Privileged EXEC mode

## Examples

This example clears all BGP4 local routes.

```
device# clear ip bgp local routes
```

This example clears BGP4 local routes for VRF "red".

```
device# clear ip bgp local routes vrf red
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# clear ip bgp neighbor

Requests a dynamic refresh of BGP4 connections or routes from a neighbor, with a variety of options.

## Syntax

```
clear ip bgp neighbor { all | as-num | ip-addr | peer-group-name } [ last-packet-with-error | notification-errors | soft [ in
  [ prefix-filter] | out ] | soft-outbound | traffic ] [ vrf vrf-name ]
```

## Parameters

### all

Resets and clears all BGP4 connections to all neighbors.

### *as-num*

Clears all BGP4 connections within this autonomous system. Range is from 1 through 4294967295.

### *peer-group-name*

Clears all BGP4 connections in this peer group. Range is from 1 through 63 characters.

### *ip-addr*

Clears all BGP4 connections with this IPv4 address, in dotted-decimal notation.

### last-packet-with-error

Clears all BGP4 connections identified as having the last packet received with an error.

### notification-errors

Clears all BGP4 connections identified as having notification errors.

### soft

Refreshes routes received from or sent to the neighbor.

#### in

Refreshes received routes.

#### prefix-filter

Refreshes Outbound Route Filters (ORFs) that are prefix-based.

#### out

Refreshes sent routes.

### soft-outbound

Refreshes all outbound routes by applying new or changed filters, but sends only the existing routes affected by the new or changed filters to the neighbor.

#### NOTE

Use **soft-outbound** only if the outbound policy is changed. This operand updates all outbound routes by applying the new or changed filters. However, the device sends to the neighbor only the existing routes that are affected by the new or changed filters. The **soft out** operand updates all outbound routes and then sends the entire BGP4 route table on the device to the neighbor after the device changes or excludes the routes affected by the filters.

### traffic

Clears the counters (resets them to 0) for BGP4 messages.



**vrf** *vrf-name*  
Specifies the name of a VRF instance.

## Modes

Privileged EXEC mode

## Examples

This example refreshes all BGP4 neighbor connections.

```
device# clear ip bgp neighbor all
```

This example refreshes all BGP4 neighbor connections for VRF "red".

```
device# clear ip bgp neighbor all vrf red
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# clear ip bgp routes

Clears BGP4 routes from the IP route table and resets the routes.

## Syntax

```
clear ip bgp routes [ ip-addr [ / mask ] ] [ vrf vrf-name ]
```

## Parameters

*ip-addr*

IPv4 address of a specified route in dotted-decimal notation.

*mask*

(Optional) IPv4 mask of a specified route in CIDR notation.

vrf *vrf-name*

Specifies the name of the VRF instance to associate with subsequent address-family configuration mode commands.

## Modes

Privileged EXEC mode

## Examples

This example clears all BGP4 routes.

```
device# clear ip bgp routes 10.0.0.0/16
```

This example clears BGP4 routes for VRF instance "red":

```
device# clear ip bgp routes 10.0.0.0/16 vrf red
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# clear ip bgp traffic

Clears the BGP4 message counter for all neighbors.

## Syntax

```
clear ip bgp traffic [ vrf vrf-name ]
```

## Parameters

**vrf** *vrf-name*

Specifies the name of a VRF instance.

## Modes

Privileged EXEC mode

## Examples

The following example clears the BGP4 message counters.

```
device# clear ip bgp traffic
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# clear ip dhcp relay statistics

Clears IP DHCP Relay statistics.

## Syntax

```
clear ip dhcp relay statistics ip-address ip-address
```

## Command Default

DHCP relay statistics are present on the DHCP server.

## Parameters

**ip-address** *ip-address*

IPv4 address of DHCP server where client requests are to be forwarded.

## Modes

Privileged EXEC mode

## Usage Guidelines

Use this command to clear IP DHCP Relay statistics for a specific IP DHCP Relay address or all addresses on the device.

## Examples

The following example clears statistics for IP DHCP Relay

```
device# clear ip dhcp relay statistics ip-address 10.1.0.1
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# clear ip ospf

Clears OSPF data processes, counters, neighbors, or routes.

## Syntax

```
clear ip ospf all [ vrf vrf-name ]
```

```
clear ip ospf counters { all | ethernet slot/port | loopback number | ve vlan_id } [ vrf vrf-name ]
```

```
clear ip ospf neighbor { ip-addr | all } [ vrf vrf-name ]
```

```
clear ip ospf routes { ip-addr/mask | all } [ vrf vrf-name ]
```

## Parameters

### all

Clears all OSPF data processes.

### vrf *name*

Specifies a VRF.

### counters

Clears OSPF counters.

#### all

Clears all counters.

#### ethernet *slot / port*

Specifies an Ethernet slot and port.

#### loopback *number*

Specifies a loopback interface. Valid values range from 1 through 255.

#### ve *vlan\_id*

Specifies a virtual Ethernet (VE) interface. Valid values range from 1 through 4096.

### neighbor

Clears neighbors.

#### *ip-addr*

Specifies the IP address of the neighbor.

#### all

Clears all neighbors.

### routes

Clears matching routes or clears all routes.

#### *ip-addr/mask*

Clears all routes that match the prefix and mask that you specify.

#### all

Clears all routes.

clear ip ospf

## Modes

Privileged EXEC mode

## Examples

The following example restarts the OSPF processes.

```
device# clear ip ospf all
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# clear ip route

Clears a specified route or all IP routes in the IP routing tables.

## Syntax

```
clear ip route { A.B.C.D | A.B.C.D/M } [ vrf vrf-name ]
```

```
clear ip route all [ vrf vrf-name ]
```

```
clear ip route slot line-card-number [ A.B.C.D | A.B.C.D/M ] [ vrf vrf-name ]
```

## Parameters

*A.B.C.D*

Specifies an IPv4 address.

*A.B.C.D/M*

Specifies an IPv4 address and mask.

vrf *vrf-name*

Specifies a VRF instance from which the user is currently retrieving routes.

all

Specifies all routes.

slot *line-card-number*

Specifies a line card.

## Modes

Privileged EXEC mode

## Examples

The following example clears the IP route specified by IP address 192.158.1.1/24.

```
device# clear ip route 192.158.1.1/24
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# clear ipv6 bgp dampening

Reactivates suppressed BGP4 routes.

## Syntax

```
clear ipv6 bgp dampening [ ipv6-addr { / mask } ] [ vrf vrf-name ]
```

## Parameters

*ipv6-addr*

IPv6 address of a specified route in dotted-decimal notation.

*mask*

IPv6 mask of a specified route in CIDR notation.

**vrf** *vrf-name*

Specifies the name of a VRF instance.

## Modes

Privileged EXEC mode

## Examples

The following example unsuppresses all suppressed BGP4+ routes.

```
device# clear ipv6 bgp dampening
```

The following example unsuppresses suppressed BGP4+ routes for VRF "red".

```
device# clear ipv6 bgp dampening vrf red
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# clear ipv6 bgp flap-statistics

Clears route-flap statistics for BGP4+ routes.

## Syntax

```
clear ipv6 bgp flap-statistics [ ipv6-addr { / mask } | neighbor ipv6-addr | regular-expression string ] [ vrf vrf-name ]
```

## Parameters

*ipv6-addr*

IPv6 address of a specified route in dotted-decimal notation.

*mask*

(Optional) IPv6 mask of a specified route in CIDR notation.

**neighbor**

Clears route-flap statistics only for routes learned from the specified neighbor.

*ipv6-addr*

IPv6 address of the neighbor.

**regular-expression**

Specifies a regular expression.

*string*

Regular expression.

**vrf vrf-name**

Specifies the name of a VRF instance.

## Modes

Privileged EXEC mode

## Examples

This example clears all dampening statistics for a BGP4+ route.

```
device# clear ipv6 bgp flap-statistics
```

This example clears the dampening statistics for a BGP4+ route for VRF "red".

```
device# clear ipv6 bgp flap-statistics vrf red
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# clear ipv6 bgp local routes

Clears BGP4+ local routes from the IP route table and resets the routes.

## Syntax

```
clear ipv6 bgp local routes [ vrf vrf-name ]
```

## Parameters

**vrf** *vrf-name*  
Specifies the name of a VRF instance.

## Modes

Privileged EXEC mode

## Examples

This example clears all BGP4+ local routes.

```
device# clear ipv6 bgp local routes
```

This example clears BGP4+ local routes for VRF "red".

```
device# clear ipv6 bgp local routes vrf red
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# clear ipv6 bgp neighbor

Requests a dynamic refresh of BGP4+ connections or routes from a neighbor, with a variety of options.

## Syntax

```
clear ipv6 bgp neighbor [ all | as-num | peer-group-name | ipv6-addr ] [ last-packet-with-error | notification-errors | soft [ in
[ prefix-filter ] | out ] | soft-outbound | traffic ] [ vrf vrfname ]
```

## Parameters

### all

Resets and clears all BGP4+ connections to all neighbors.

### as-num

Clears all BGP4+ connections within this autonomous system. Range is from 1 through 4294967295.

### peer-group-name

Clears all BGP4+ connections in this peer group. Range is from 1 through 63 characters.

### ipv6-addr

Clears all BGP4+ connections with this IPv6 address, in dotted-decimal notation.

### last-packet-with-error

Clears all BGP4+ connections identified as having the last packet received with an error.

### notification-errors

Clears all BGP4+ connections identified as having notification errors.

### soft

Refreshes routes received from or sent to the neighbor.

#### in

Refreshes received routes.

#### prefix-filter

Refreshes Outbound Route Filters (ORFs) that are prefix-based.

#### out

Refreshes sent routes.

### soft-outbound

Refreshes all outbound routes by applying new or changed filters, but sends only the existing routes affected by the new or changed filters to the neighbor.

#### NOTE

Use **soft-outbound** only if the outbound policy is changed. This operand updates all outbound routes by applying the new or changed filters. However, the device sends to the neighbor only the existing routes that are affected by the new or changed filters. The **soft out** operand updates all outbound routes and then sends the entire BGP4+ route table on the device to the neighbor after the device changes or excludes the routes affected by the filters.

### traffic

Clears the counters (resets them to 0) for BGP4+ messages.

clear ipv6 bgp neighbor

**vrf** *vrf-name*

Specifies the name of a VRF instance.

## Modes

Privileged EXEC mode

## Examples

This example refreshes all BGP4+ neighbor connections.

```
device# clear ipv6 bgp neighbor all
```

This example resets all the counters for BGP4+ messages.

```
device# clear ipv6 bgp neighbor all traffic
```

This example clears BGP4+ connections with a specified peer group.

```
device# clear ipv6 bgp neighbor P1
```

This example clears BGP4+ connections with a specified peer group for VRF "red".

```
device# clear ipv6 bgp neighbor P1 vrf red
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# clear ipv6 bgp routes

Clears BGP4+ routes from the IP route table and resets the routes.

## Syntax

```
clear ipv6 bgp routes [ ipv6-addr [ / mask ] ] [ vrf vrfname ]
```

## Parameters

*ipv6-addr*

IPv6 address of a specified route in dotted-decimal notation.

*mask*

(Optional) IPv6 mask of a specified route in CIDR notation.

**vrf** *vrf-name*

Specifies the name of a VRF instance.

## Modes

Privileged EXEC mode

## Examples

This example clears specific BGP4+ routes.

```
device# clear ipv6 bgp routes 2000::/64
```

This example clears specific BGP4+ routes for VRF "red".

```
device# clear ipv6 bgp routes 2000::/64 vrf red
```

## History

Release version	Command history
16r.1.00	This command was introduced.

clear ipv6 bgp traffic

# clear ipv6 bgp traffic

Clears the BGP4+ message counter for all neighbors.

## Syntax

```
clear ipv6 bgp traffic [ vrf vrf-name ]
```

## Modes

Privileged EXEC mode

## Parameters

**vrf** *vrf-name*  
Specifies the name of a VRF instance.

## Examples

This example clears all BGP4+ message counters.

```
device# clear ipv6 bgp traffic
```

This example clears BGP4+ message counters for VRF "red".

```
device# clear ipv6 bgp traffic vrf red
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# clear ipv6 counters

Clears IPv6 counters on all interfaces or on a specified interface.

## Syntax

```
clear ipv6 counters [ all | interface { ethernet slot/port | loopback port-number | ve ve-id }
```

## Parameters

### all

Specifies all interfaces.

### ethernet

Represents a valid, physical Ethernet subtype.

#### slot

Specifies a valid slot number.

#### port

Specifies a valid port number.

### loopback

Specifies a loopback interface.

#### port-number

Port number of the loopback interface. The range is from 1 through 255.

### ve

Specifies a virtual Ethernet (VE) interface.

#### ve\_id

ID of the VE interface. The range is from 1 through 4096.

## Modes

Privileged EXEC mode

## Examples

The following example clears counters on Ethernet 2/3.

```
device# clear ipv6 counters interface ethernet 2/3
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# clear ipv6 dhcp relay statistics

Clears IPv6 DHCP Relay statistics

## Syntax

```
clear ipv6 dhcp relay statistics ip-address ip-address
```

## Command Default

DHCP relay statistics are present on the DHCP server.

## Parameters

**ip-address** *ip-addr*

IPv6 address of DHCP server where client requests are to be forwarded.

## Modes

Privileged EXEC mode

## Usage Guidelines

Use this command to clear all the DHCP Relay statistics.

## Examples

Clear all the DHCP Relay statistics on the device.

```
device# clear ipv6 dhcp relay statistics
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# clear ipv6 neighbor

Removes entries from the IPv6 neighbor table.

## Syntax

```
clear ipv6 neighbor [ ipv6-address ] [ ethernet port/slot | ve ve-number ] [ force-delete | no-refresh | vrf vrf-name ]
```

## Parameters

### ipv6-address

Removes cache entries for the specified IPv6 address.

### force-delete

Force deletes all the dynamic neighbor entries.

### ethernet

Removes neighbor entries for the Ethernet interface.

### ve *ve-number*

Removes neighbor entries for the the specified Virtual Ethernet (VE) interface.

### no-refresh

Deletes all the dynamic neighbor entries.

### vrf *vrf-name*

Removes entries from the IPv6 neighbor table for the specified VRF instance.

## Modes

Privileged EXEC mode

## Usage Guidelines

You must specify the *ipv6-address* parameter in hexadecimal using 16-bit values between colons as documented in RFC 2373.

## Examples

The following example removes neighbor entries for Ethernet interface 1/3.

```
device# clear ipv6 neighbor ethernet 1/3 force-delete
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# clear ipv6 ospf

Clears OSPFv3 data processes, counts, force-spf, neighbors, redistribution, routes, and traffic.

## Syntax

```
clear ipv6 ospf all [ vrf vrf-name ]
```

```
clear ipv6 ospf counts [ vrf vrf-name ]
```

```
clear ipv6 ospf counts neighbor A.B.C.D [ vrf vrf-name ]
```

```
clear ipv6 ospf counts neighbor interface { ethernet slot/port | loopback number | ve vlan_id } [ A.B.C.D ]
```

```
clear ipv6 ospf { force-spf | redistribution | traffic } [ vrf vrf-name ]
```

```
clear ipv6 ospf neighbor A.B.C.D [ vrf vrf-name ]
```

```
clear ipv6 ospf neighbor all [ vrf vrf-name ]
```

```
clear ipv6 ospf neighbor interface { ethernet slot/port | loopback number | ve vlan_id } [ A.B.C.D ]
```

```
clear ipv6 ospf routes { IPv6addr | all } [ vrf vrf-name ]
```

## Parameters

### all

Clears all OSPFv3 data.

### counts

Clears OSPFv3 counters.

### neighbor

Clears all OSPF counters for a specified neighbor.

*A.B.C.D*

Specifies a neighbor.

### vrf *vrf-name*

Specifies a VRF.

### interface

Specifies an interface.

### ethernet *slot / port*

Specifies an Ethernet slot and port.

### loopback *number*

Specifies a loopback interface. Valid values range from 1 through 255.

### ve *vlan\_id*

Specifies a virtual Ethernet (VE) interface. Valid values range from 1 through 4096.

### force-spf

Performs the shortest path first (SPF) calculation without clearing the OSPFv3 database.

### redistribution

Clears OSPFv3 redistributed routes.

**traffic**

Clears OSPFv3 traffic statistics.

**routes**

Clears OSPFv3 routes.

## Modes

Privileged EXEC mode

## Usage Guidelines

Use the **force-spf** keyword to perform the shortest path first (SPF) calculation without clearing the OSPFv3 database.

## Examples

The following example restarts the OSPFv3 processes.

```
device# clear ipv6 ospf all
```

The following example clears all OSPFv3 counters for a specified neighbor.

```
device# clear ipv6 ospf counts neighbor 10.10.10.1
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# clear ipv6 route

Clears IPv6 routes.

## Syntax

```
clear ipv6 route [ ipv6-address vrf vrf-name ] [ all vrf vrf-name ] [ slot slot-number ]
```

## Parameters

*ipv6-address*

Removes IPv6 routes for the specified IPv6 address.

**vrf** *vrf-name*

Removes IPv6 routes for the specified VPN Routing and Forwarding (VRF) instance.

**all**

Removes all IPv6 routes.

**slot** *slot-number*

Removes IPv6 routes for the specified line card.

## Modes

Privileged EXEC mode

## Examples

The following example clears IPv6 routes associated with the prefix 2000:7838::/32.

```
device# clear ipv6 route 2000:7838::/32
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# clear ipv6 vrrp statistics

Clears IPv6 VRRPv3 session statistics for all virtual groups, for a specified interface, or for a specified virtual group.

## Syntax

```
clear ipv6 vrrp statistics [ all ]
clear ipv6 vrrp statistics [ interface { ethernet slot/port | ve vlan_id } ]
clear ipv6 vrrp statistics [ session VRID ]
```

## Parameters

### all

Clears all IPv6 VRRP statistics.

### session *VRID*

Specifies the virtual group ID on which to clear statistics. The range is from 1 through 128.

### interface

Specifies an interface.

### ethernet *slot port*

Specifies a valid, physical Ethernet interface with a slot and port number.

### ve *vlan\_id*

Specifies the VE VLAN number. The range is from 1 through 4096.

## Modes

Privileged EXEC mode

## Usage Guidelines

This command is supported in IPv6 VRRPv3 and VRRP-E-v3.

## Examples

The following example clears all IPv6 VRRPv3 statistics for all virtual groups.

```
device# clear ipv6 vrrp statistics all
```

The following example clears statistics for an IPv6 VRRPv3 session of virtual group 25.

```
device# clear ipv6 vrrp statistics session 25
```

The following example clears IPv6 VRRPv3 statistics on a specified virtual Ethernet interface.

```
device# clear ipv6 vrrp statistics interface ve 10
```

clear ipv6 vrrp statistics

## History

Release version	Command history
16r.1.00	This command was introduced.

# clear isis all

Clears all IS-IS information.

## Syntax

```
clear isis all
```

## Modes

Privileged EXEC mode

## Examples

This example clears all IS-IS information for a device.

```
device# clear isis all
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# clear isis counts

Clears IS-IS error statistics for a device.

## Syntax

`clear isis counts`

## Modes

Privileged EXEC mode

## Examples

This example clears IS-IS error statistics.

```
device# clear isis counts
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# clear isis database

Clears IS-IS database entries.

## Syntax

```
clear isis database [ lsp-id level-1 | level-2 ]
```

## Parameters

### lsp-id

Specifies a link-state packet (LSP) in HHHH.HHHH.HHHH.HH-HH format or by entering a name, HH-HH.

### level-1

Specifies Level 1 packets only.

### level-2

Specifies Level 2 packets only.

## Modes

Privileged EXEC mode

## Examples

This example clears IS-IS database entries, specifying a LSP name of "XMR.00-00".

```
device# clear isis database XMR-1.00-00
```

This example clears IS-IS database entries for Level 1 LSPs.

```
device# clear isis database level-1
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# clear isis force-spf

Performs the shortest path first (SPF) calculation without clearing the IS-IS database.

## Syntax

```
clear isis force-spf [ level-1 | level-2 ]
```

## Parameters

**level-1**

Specifies Level 1 packets only.

**level-2**

Specifies Level 2 packets only.

## Modes

Privileged EXEC mode

## Examples

This example specifies that SPF calculations can be performed without clearing the IS-IS database for Level 2 packets.

```
device# clear isis force-spf level-2
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# clear isis force-v6spf

Performs the IPv6 shortest path first (SPF) calculation without clearing the IS-IS database.

## Syntax

```
clear isis force-v6spf [ level-1 | level-2 ]
```

## Parameters

### level-1

Specifies Level 1 packets only.

### level-2

Specifies Level 2 packets only.

## Modes

Privileged EXEC mode

## Examples

This example specifies that IPv6 SPF calculations can be performed without clearing the IS-IS database for Level 1 packets.

```
device# clear isis force-v6spf level-1
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# clear isis ipv6 spf-log

Clears IPv6 IS-IS SPF logs.

## Syntax

```
clear isis ipv6 spf-log [ level-1 | level-2 ]
```

## Parameters

### level-1

Specifies Level 1 packets only.

### level-2

Specifies Level 2 packets only.

## Modes

Privileged EXEC mode

## Examples

This example clears IPv6 IS-IS logs for Level 1 packets.

```
device# clear isis ipv6 spf-log level-1
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# clear isis neighbor

Clears IS-IS neighbors.

## Syntax

```
clear isis neighbor { lsp-id | all } [ ethernet slot/port | ve vlan_id ]
```

## Parameters

### **lsp-id**

Specifies a link-state packet (LSP) in HHHH.HHHH.HHHH.HH-HH format or by entering a name, HH-HH.

### **all**

Specifies all neighbors.

### **ethernet slot / port**

Specifies an Ethernet slot and port.

### **ve vlan\_id**

Specifies a virtual Ethernet (VE) interface.

## Modes

Privileged EXEC mode

## Examples

This example clears IS-IS neighbors, specifying a LSP name of "XMR.00-00".

```
device# clear isis neighbor XMR-1.00-00
```

This example clears all IS-IS connections for a specified Ethernet interface.

```
device# clear isis neighbor all ethernet 1/1
```

This example refreshes all IS-IS neighbors.

```
device# clear isis neighbor all
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# clear isis route

Clears IS-IS routes.

## Syntax

```
clear isis route { ip-address | ip-address/mask | all }
```

## Parameters

*ip-address*

Clears all routes that match the prefix that you specify.

*ip-address/mask*

Clears all routes that match the prefix and mask that you specify.

**all**

Specifies all routes.

## Modes

Privileged EXEC mode

## Examples

This example clears IS-IS routes that match the IP address 10.1.1.1.

```
device# clear isis route 10.1.1.1
```

This example clears all IS-IS routes.

```
device# clear isis route all
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# clear isis spf-log

Clears IPv4 IS-IS SPF logs.

## Syntax

```
clear isis spf-log [ level-1 | level-2 ]
```

## Parameters

### level-1

Specifies Level 1 packets only.

### level-2

Specifies Level 2 packets only.

## Modes

Privileged EXEC mode

## Examples

This example clears IPv4 IS-IS logs for Level 2 packets.

```
device# clear isis spf-log level-2
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# clear isis traffic

Clears IS-IS packet counters.

## Syntax

`clear isis traffic`

## Modes

Privileged EXEC mode

## Examples

This example clears IS-IS packet counters.

```
device# clear isis traffic
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# clear lacp

Clears the Link Aggregation Group Control Protocol (LACP) counters on a specific port-channel.

## Syntax

```
clear lacp number counters
```

## Parameters

*number*

Specifies the port channel-group number. Valid values range from 1 through 6144.

**counters**

Clears traffic counters.

## Modes

Privileged EXEC mode

## Examples

To clear the LACP counters for a specific port-channel:

```
device# clear lacp 10 counters
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# clear lacp counters

Clears the Link Aggregation Group Control Protocol (LACP) counters on all port-channels.

## Syntax

`clear lacp counters`

## Modes

Privileged EXEC mode

## Examples

To clear the counters for all port-channels:

```
device# clear lacp counters
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# clear link-oam statistics

Clears the Link OAM statistics.

## Syntax

```
clear link-oam statistics
```

## Modes

Privileged EXEC mode

## Examples

This example shows how to clear the Link OAM statistics.

```
device# clear link-oam statistics
```

## History

Release version	Command history
17r.1.01	This command was introduced.

# clear lldp neighbors

Clears the Link Layer Discovery Protocol (LLDP) neighbor information on all or specified ethernet interfaces.

## Syntax

```
clear lldp neighbors [ interface ethernet slot/port ]
```

## Parameters

### **ethernet**

Use this parameter to specify an ethernet interface, followed by the slot or port number.

### *slot*

Specifies a valid slot number.

### *port*

Specifies a valid port number.

## Modes

Privileged EXEC mode

## Usage Guidelines

If the **interface** parameter is not specified, this command clears the LLDP neighbor information received on all the interfaces.

## Examples

To clear the LLDP neighbor information for all interfaces:

```
device# clear lldp neighbors
```

To clear LLDP neighbor information on a specific ethernet interface:

```
device# clear lldp neighbors interface ?
Possible completions:
ethernet Ethernet interface
device# clear lldp neighbors interface ethernet ?
Description: The list of Ethernet interfaces.
Possible completions:
1/1
1/2
1/3
1/4
1/5
1/6
1/8
1/9
1/10
1/11
1/12
1/13
1/14
1/15
1/16
1/17
1/18
1/19
1/20
1/21
1/22
1/23
1/24
1/25
1/29
1/30
1/31
device# clear lldp neighbors interface ethernet 1/24
device#
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# clear lldp statistics

Clears LLDP statistics for all interfaces or a specified Ethernet interface.

## Syntax

```
clear lldp statistics [ interface ethernet slot/port ]
```

## Parameters

### **ethernet**

Use this parameter to specify an ethernet interface, followed by the slot or port number.

### *slot*

Specifies a valid slot number.

### *port*

Specifies a valid port number.

## Modes

Privileged EXEC mode

## Usage Guidelines

If the **interface** parameter is not specified, this command clears all the LLDP statistics on all interfaces.

## Examples

To clear all the LLDP statistics for all interfaces:

```
device# clear lldp statistics
```

To clear LLDP neighbor information on a specific ethernet interface:

```
device# clear lldp statistics interface ?
Possible completions:
ethernet Ethernet interface
device# clear lldp statistics interface ethernet ?
Description: The list of Ethernet interfaces.
Possible completions:
1/1
1/2
1/3
1/4
1/5
1/6
1/8
1/9
1/10
1/11
1/12
1/13
1/14
1/15
1/16
1/17
1/18
1/19
1/20
1/21
1/22
1/23
device#clear lldp statistics interface ethernet 1/23
device#
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# clear loop-detection

Enables ports that were disabled by the loop detection (LD) protocol, and clears LD statistics at the global, interface, or VLAN level.

## Syntax

```
clear loop-detection [ interface { ethernet interface | port-channel interface } | vlan vlan-id ]
```

## Command Default

This feature is disabled.

## Parameters

### interface

Specifies an Ethernet or port-channel interface.

#### ethernet *interface*

Specifies an Ethernet interface.

#### port-channel *interface*

Specifies a port-channel interface.

### vlan *vlan-id*

Specifies a VLAN.

## Modes

Privileged EXEC mode

## Examples

To enable LD-disabled ports and clear LD statistics on all interfaces:

```
device# clear loop-detection
```

To enable LD-disabled ports and clear LD statistics on an Ethernet interface:

```
device# clear loop-detection interface ethernet 2/6
```

To enable LD-disabled ports and clear LD statistics on a port-channel interface:

```
device# clear loop-detection interface port-channel 20
```

To enable LD-disabled ports and clear LD statistics on a VLAN:

```
device# clear loop-detection interface vlan 10
```



## History

Release version	Command history
17r.1.00	This command was introduced.

# clear mac-address-table

Removes interface entries from the MAC address table.

## Syntax

```
clear mac-address-table cluster cluster-id [client [client-id]] | dynamic [address mac-address | bridge-domain [id] | interface
ethernet slot/port | port-channel number | logical-interface ethernet slot/port [:brk-out], lif-id | vlan vlan-id]
```

## Parameters

### bridge-domain

Specifies clearing MAC addresses learned under a bridge domain.

*id*

Specifies a bridge-domain identifier.

### cluster *cluster-id*

Specifies clearing MAC addresses from an MCT cluster ID. The ID range is 1 - 65535.

### client *client-id*

Specifies clearing the client instance. Specify the client ID with a maximum of 64 characters.

### dynamic address *MAC-address*

Specifies clearing the dynamic MAC address. The valid format is *H.H.H* (available in Privileged EXEC mode only).

### interface ethernet *slot/port*

Specifies clearing the ethernet interface with a valid slot number/port number.

### port-channel *number*

Specifies clearing the port channel interface number. The range is from 1 - 512 based on the platform.

### logical-interface ethernet *slot/port* [:*brk-out*], *lif-id*

Specifies clearing the logical ethernet interface on a specified slot/port number. The breakout interface option can be used with the LIF ID.

### vlan *vlan id*

Specifies clearing the VLAN interface. The VLAN ID range is from 1 - 4090.

## Modes

Privileged EXEC mode.

## Usage Guidelines

When a bridge-domain identifier is not specified, MAC addresses learned under all bridge domains are removed from the MAC address table. If a specific address is not specified, all dynamic mac-addresses are deleted from the MAC address table.

## Examples

The following example shows how to clear MAC addresses learned under bridge domain 1 from the MAC address table.

```
device# clear mac-address-table dynamic bridge-domain 1
```

The following example shows how to clear MAC addresses learned from vlan 1 from the MAC address table.

```
device# clear mac-address-table dynamic vlan 1
```

The following example shows how to clear MAC addresses from a logical interface ethernet 3/10 LIF breakout interface.

```
device# clear mac-address-table dynamic 3/10:5.200
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# clear mpls auto-bandwidth-samples

Deletes the sample-history from the auto-bandwidth LSPs.

## Syntax

```
clear mpls auto-bandwidth-samples [ lsp lsp_name | all ]
```

## Command Default

None.

## Parameters

**lsp** *lsp\_name*

The **lsp** option clears the auto-bandwidth sample history for the LSP specified through the *lsp\_name*.

**all**

Clears all the auto-bandwidth sample history.

## Modes

EXEC mode.

## Examples

The following example clears the sample history for *LSP1*.

```
device# auto-bandwidth-samples lsp lsp1
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# clear mpls lsp

Allows the user to reset normal LSPs. The user has the option of supplying the primary or secondary parameter for a normal LSP to reset only the primary or secondary path of the LSP.

## Syntax

```
clear mpls lsp { lsp_name } [ primary | secondary ]
```

## Parameters

*lsp\_name*

Specifies the target LSP by name.

**primary**

Specifies that the primary LSP path associated with the *lsp\_name* is reset and restarted.

**secondary**

Specifies that the secondary LSP path associated with the *lsp\_name* is reset and restarted.

## Modes

Privileged EXEC mode

## Examples

When the user resets an LSP with the clear mpls lsp command, the following information message is displayed.

```
"Disconnecting signaled LSP name"  
"Connecting signaled LSP name"
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# clear mpls statistics

Clears the MPLS statistics.

## Syntax

```
clear mpls statistics { oam }
```

```
clear mpls statistics { transit [ label label | ldp [ ip_addr | submask | label ] | rsvp label ] }
```

```
clear mpls statistics { tunnel [ destination ip_addr | index vif_index | ldp [ destination ip_addr | index vif_index ] | rsvp [ destination ip_addr | index vif_index | name name ] ] }
```

## Parameters

### oam

Clears the MPLS OAM statistics.

### transit

Clears the MPLS transit statistics.

**label** *label*

Clears the MPLS transit statistics for the selected label.

**ldp** *ip\_addr*

Clears the MPLS transit LDP statistics for the selected IP address.

**rsvp**

Clears the MPLS transit RSVP statistics .

### tunnel

Clears the MPLS tunnel statistics.

**destination** *destination*

Clears the MPLS tunnel statistics for the selected tunnel destination.

**index** *vif\_index*

Clears the MPLS tunnel statistics for the selected tunnel index.

**ldp**

Clears the MPLS tunnel LDP statistics.

**destination** *destination*

Clears the MPLS tunnel statistics for the selected tunnel destination.

**index** *vif\_index*

Clears the MPLS tunnel statistics for the selected tunnel index.

**rsvp**

Clears the MPLS tunnel RSVP statistics.

**destination** *destination*

Clears the MPLS tunnel statistics for the selected tunnel destination.

**index** *vif\_index*

Clears the MPLS tunnel statistics for the selected tunnel index.

**name** *name*

Clears the MPLS tunnel statistics for the selected named tunnel.

## Modes

MPLS policy mode.

## Examples

The following example clears the MPLS statistics.

```
device# configure
device(config)# router mpls
device(config-router-mpls)# policy
device(config-mpls-policy)# clear mpls statistics
```

## History

Release version	Command history
16r.1.01	This command was introduced.

# clear openflow

Clears a single OpenFlow rule based on a Flow ID or deletes all flows/groups/meters configured in the system.

## Syntax

```
clear openflow all | flowid flowid
```

## Parameters

**all**

Deletes all flows in the flow table.

**flowid** *flowid*

Deletes a single OpenFlow rule with the specified Flow ID.

## Modes

Privileged EXEC mode

## Usage Guidelines

This command deletes the rule irrespective of the state it is in (ACTIVE, PENDING\_ADD, PENDING\_MODIFY, or PENDING\_DELETE).

## Examples

To delete a single OpenFlow rule based on a Flow ID:

```
device# clear openflow flowid 255
```

To delete all flows/groups/meters configured in the system:

```
device# clear openflow all
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# clear overlay-gateway

Clear counters for the specified gateway.

## Syntax

```
clear overlay-gateway name { statistics | vlan statistics }
```

## Parameters

*name*

Specifies the name of the VXLAN gateway profile.

**statistics**

Clears all statistics for the VXLAN gateway.

**vlan statistics**

Clears per-VLAN statistics for the VXLAN gateway.

## Modes

Privileged EXEC mode

## Usage Guidelines

If you specify the VXLAN gateway name, the gateway must already be configured.

If you specify VLAN IDs, these VLANs must already be configured as exported VLANs for the gateway.

## Examples

The following example clears all counters for the already configured VXLAN gateway named gateway1.

```
device# clear overlay-gateway gateway1 statistics
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# clear policy-map-counters

Provides a mechanism for clearing the policy map counters.

## Syntax

```
clear policy-map-counters [ interface ethernet slot/port ] [ in | out ]
```

## Parameters

### interface

Specifies an interface.

### ethernet

Represents a valid, physical Ethernet type for all available Ethernet speeds.

### slot/port

Specifies a slot and port number.

### in

Specifies clearing the ingress counters.

### out

Specifies clearing the egress counters.

## Modes

Privileged EXEC mode

## Usage Guidelines

Use this command with a specific interface and direction to clear the policy map counters for that interface.

Use this command without identifying an interface and direction of traffic to clear all of the policy map counters..

## Examples

To clear the policy map counters for a specific interface use the following command:

```
device# clear policy-map-counters interface ethernet 2/2
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# clear spanning-tree counter

Clears all spanning-tree counters on an Ethernet or port-channel interface.

## Syntax

```
clear spanning-tree counter [ interface { ethernet slot/port | port-channel number }
```

## Parameters

### interface

Specifies an interface.

### ethernet

Specifies an Ethernet interface.

### *slot*

Specifies a valid slot number. Must be 0 if the switch does not contain slots.

### *port*

Specifies a valid port number.

### port-channel *number*

Specifies a port-channel. The number of available channels ranges from 1 through 6144.

## Modes

Privileged EXEC mode

## Usage Guidelines

If the **interface** parameter is not specified, spanning-tree counters are cleared for all interfaces.

## Examples

To clear spanning-tree counters for all interfaces:

```
device# clear spanning-tree counter
```

To clear spanning-tree counters for an Ethernet interface:

```
device# clear spanning-tree counter interface ethernet 0/1
```

To clear spanning-tree counters for port-channel 23:

```
device# clear spanning-tree counter interface port-channel 23
```

clear spanning-tree counter

## History

Release version	Command history
16r.1.00	This command was introduced.

# clear spanning-tree detected-protocols

Clears all spanning-tree detected protocols on an Ethernet or port-channel interface.

## Syntax

```
clear spanning-tree detected-protocols [ interface { ethernet slot/port | port-channel number }
```

## Parameters

### interface

Specifies an interface.

### ethernet

Specifies an Ethernet interface.

### *slot*

Specifies a valid slot number. Must be 0 if the switch does not contain slots.

### *port*

Specifies a valid port number.

### port-channel *number*

Specifies a port-channel. The number of available channels ranges from 1 through 6144.

## Modes

Privileged EXEC mode

## Usage Guidelines

If the **interface** parameter is not specified, spanning-tree detected protocols are cleared for all interfaces.

## Examples

To clear detected protocols on all interfaces:

```
device# clear spanning-tree detected-protocols
```

To clear detected protocols on an Ethernet interface:

```
device# clear spanning-tree detected-protocols interface ethernet 0/1
```

To clear detected protocols on port-channel 23:

```
device# clear spanning-tree detected-protocols interface port-channel 23
```

clear spanning-tree detected-protocols

## History

Release version	Command history
16r.1.00	This command was introduced.

# clear statistics bridge-domain

Clears the statistics for all the logical interfaces on bridge domains.

## Syntax

```
clear statistics bridge-domain bd-id
```

## Parameters

*bd-id*

The bridge domain ID.

## Command Default

Statistics are disabled.

## Modes

Privileged EXEC mode

## Usage Guidelines

This command is also available in global configuration mode.

The **clear statistics bridge-domain** *bd-id* command clears the statistics for all the logical interfaces on a specific bridge domain.

## Examples

The following example shows how to clear the statistics for all the logical interfaces on all bridge domains.

```
device# clear statistics bridge-domain
```

The following example shows how to clear the statistics for all the logical interfaces on bridge domain 2.

```
device# clear statistics bridge-domain 1
```

## History

Release version	Command history
16r.1.01	This command was introduced.

# clear statistics openflow

Clears the flow statistics for all flows or for a specified flow.

## Syntax

```
clear statistics openflow [controller | flow | group | meter]
```

## Parameters

*controller*

Sends statistics for the controller in a flow.

*flow*

Deletes the flow statistics for a specified flow on the OpenFlow controller.

*group*

Clears statistics for all groups.

*meter*

Clears statistics for all meters.

## Modes

Privileged EXEC mode

## Examples

```
device# clear statistics openflow
controller  send to controller statistics
flow       Flow
group      Clear statistics for all groups
meter     Clear statistics for all meters
device#
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# clear statistics vlan

Clears the statistics for all the ports and port channels on configured VLANs.

## Syntax

```
clear statistics vlan vlan-id
```

## Parameters

*vlan-id*

The specific VLAN ID.

## Command Default

Statistics are disabled.

## Modes

Privileged EXEC mode

## Usage Guidelines

This command is also available in global configuration mode.

The **clear statistics vlan** *vlan-id* command clears the statistics for all the ports and port channels on the given VLAN.

## Examples

The following example shows how to clear the statistics for all the ports and port channels on the given VLAN.

```
device# clear statistics vlan
```

The following example shows how to clear the statistics for all the ports and port channels on VLAN 10.

```
device# clear statistics vlan 10
```

## History

Release version	Command history
16r.1.01	This command was introduced.

# clear tm voq-stat ingress-device

Clears the traffic management VOQ statistics on the ingress device for a specified ethernet port, or for all ports.

## Syntax

```
clear tm voq-stat ingress-device {{ ethernet slot/port } {egress-port ethernet slot/port} | all }}
clear tm voq-stat ingress-device all egress-port ethernet slot/port | all
```

## Parameters

**ethernet slot/port**

Specifies the ethernet interface in slot/port format.

**egress-port ethernet slot/port**

Specifies clearing the traffic management statistics on the egress ethernet slot/ port.

**all**

Specifies clearing the traffic management statistics for all ports.

## Modes

Privileged EXEC mode.

## Examples

To clear VOQ statistics information on the egress-port for ethernet 1/1, use the following command.

```
device# clear tm voq-stat ingress-device ethernet 1/1 egress-port ethernet 1/1
```

To clear all VOQ statistics information on the egress-port for ethernet 1/1, use the following command.

```
device# clear tm voq-stat ingress-device all egress-port ethernet 1/1
```

## History

Release version	Command history
16r.1.01	This command was introduced.

# clear tm voq-stat slot

Clears the traffic management VOQ statistics for a line card (LC) in a named slot.

## Syntax

```
clear tm voq-stat slot slot_number [ cpu-group [ cpu_group_id | all ]
```

## Parameters

*slot\_number*

The linecard slot.

**cpu-group** *cpu\_group\_id*

The ID number for the CPU group.

## Modes

Privileged EXEC mode.

## Examples

To clear information about the VOQ for the LC in slot 1 CPU group 1 use the following command.

```
device# clear tm voq-stat slot 1 cpu-group 1
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# clear tunnel statistics

Clears statistics from the tunnel interfaces.

## Syntax

```
clear tunnel statistics tunnel-id
```

## Parameters

*tunnel-id*

Specifies the tunnel ID.

## Modes

Privileged EXEC mode

## Examples

This example removes statistics from a tunnel interface.

```
device# clear tunnel statistics 10
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# clear udd statistics

Clears UDLD statistics.

## Syntax

```
clear udd statistics[ interface { ethernet slot/port }]
```

## Parameters

### interface

Specifies an interface.

### ethernet slot port

Specifies a valid, physical Ethernet interface with a slot and port number.

## Modes

Privileged EXEC mode

## Usage Guidelines

Clears either all unidirectional link detection (UDLD) protocol statistics or clears the statistics on a specified port.

## Examples

To clear UDLD statistics on a specific interface:

```
device# clear udd statistics interface 0/1
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# clear vrrp statistics

Clears VRRP statistics.

## Syntax

```
clear vrrp statistics
```

```
clear vrrp statistics [ interface { ethernet slot/port | ve vlan_id } ]
```

```
clear vrrp statistics session VRID
```

## Parameters

**interface**

Specifies an interface.

**ethernet** *slot port*

Specifies a valid, physical Ethernet interface with a slot and port number.

**ve** *vlan\_id*

Specifies the VE VLAN number. The range is from 1 through 6144.

**session** *VRID*

Specifies the virtual group ID on which to clear statistics. The range is from 1 through 255.

## Modes

Privileged EXEC mode

## Usage Guidelines

This command clears VRRP session statistics for all virtual groups, for a specified interface or for a specified virtual group.

This command is for VRRP and VRRP-E. VRRP-E supports only the **ve** *vlan\_id* interface type.

To clear all vrrp statistics, use the **clear vrrp statistics** command with no operands.

## Examples

The following example clears all VRRP statistics for all virtual groups.

```
device# clear vrrp statistics
```

The following example clears statistics for Ethernet interface 1/6.

```
device# clear vrrp statistics interface ethernet 1/6
```

The following example clears statistics for a session for a VRRP virtual group called "vrrp-group-25".

```
device# clear vrrp statistics session 25
```

The following example clears VRRP statistics on a specified virtual Ethernet (VE) interface.

```
device# clear vrrp statistics interface ve 10
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# CLI

In a Python shell, runs a device CLI command or series of commands. You can also assign the output of such commands to a Python object.

## Syntax

```
CLI ( ' device-CLI-command ' [ \n ' device-CLI-command ' ] [ do_print = ] { True | False } )
```

## Parameters

*device-CLI-command*

An SLX-OS CLI command. You separate additional commands with `\n`.

**do\_print =**

Specify whether or not to print the output of *device-CLI-command* to the default device. The default is to print the output.

**True**

Print the output.

**False**

Do not print the output.

## Modes

Python command shell

## Usage Guidelines

Divergences between the CLI syntax and Python syntax include the following differences:

- Although in general, the CLI syntax is not case-sensitive, our convention is to use lower-case.
- Python syntax is case sensitive. Regarding the syntax documented in the current topic, note the following:
  - The syntax of the command is upper case (CLI) and not lower case (cli).
  - The syntax of the **do\_print =** options is to capitalize the first letter: { **True** | **False** }

In Python, double quotes (") and single quotes (') are equivalent.

As delimiter between multiple CLI commands, use `\n`.

There is a difference between running a sequence of SLX-OS CLI commands in the Python shell rather than in the standard SLX-OS interface. Whereas in the standard interface the result of a command is persistent, in the Python shell each `CLI ( )` statement is independent of any preceding ones.

For support of the `CLI ( )` command, although a Python script must include a `from CLI import CLI` statement, this statement is automatically implemented when launching the Python interpreter interactively.



Within a script or interactive session, if you assign a CLI command or series of commands to a Python variable, you can then append the following functions to the variable:

- **.rerun()**—updates the variable from a new run of the CLI command or series of commands.

```
device# python
Python 3.4.3 (default, Apr 11 2014, 13:05:18)
[GCC 4.8.2] on linux
Type "help", "copyright", "credits" or "license" for more information.
>>> cmd_show_running_ve = CLI('show running-config interface ve')
!Command: show running-config interface ve
!Time: Mon Aug 22 16:53:13 2016

% No entries found.
# The SLX-OS show running-config interface ve command is run,
# and that command is assigned to the Python variable cmd_show_running_ve.

>>> cmd_config_ve = CLI('configure \n interface ve 101-103')
# A series of three commands are run and assigned to the Python variable cmd_config_ve.
!Command: configure
interface ve 101-103
!Time: Mon Aug 22 16:53:13 2016

>>> cmd_show_running_ve.rerun()
# The rerun() function appended to cmd_show_running_ve gives the following output:
!Command: show running-config interface ve
!Time: Mon Aug 22 16:53:13 2016

interface Ve 101
shutdown
!
interface Ve 102
shutdown
!
interface Ve 103
shutdown
!
!
```

- **.get\_output()**—returns the value of a new run of the CLI command or series of commands, as a list.

```
#Required in all scripts for SLX:
from CLI import CLI
# Import the Python Regular Expressions (re) module:
import re
# Create Python objects:
slot_firmware = {}

cmd_show_ver = CLI("show ver", False)
# Using .get_output(), assign the result of show ver to a Python object named output:
output = cmd_show_ver.get_output()
for line in output:
    found = re.search(r'^(\S+)\s+(\S+)\s+(\S+)\s+ACTIVE.*$', line, re.M)
    if found:
        slot_firmware[found.group(1)] = found.group(3)

print("SLOT_FIRMWARE:\n")
for key in slot_firmware:
    print("\t", key, "\t=> ", slot_firmware[key])
```

## Examples

The following example launches the Python shell and then both assigns a series of CLI configuration commands to a Python variable and runs those commands.

```
device# python
Python 3.4.3 (default, Apr 11 2014, 13:05:18)
[GCC 4.8.2] on linux
Type "help", "copyright", "credits" or "license" for more information.
>>> cmd_config_ve = CLI('configure \n interface ve 101-103')
!Command: configure
      interface ve 101-103
!Time: Mon Aug 22 16:57:36 2016
>>>
```

The following example launches the Python shell and then both assigns a CLI operational command to a Python variable and runs that command.

```
device# python
Python 3.4.3 (default, Apr 11 2014, 13:05:18)
[GCC 4.8.2] on linux
Type "help", "copyright", "credits" or "license" for more information.
>>> cmd_reload_system = CLI('reload system \n y')
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# client

Configures a Multi-Chassis Trunking (MCT) client for a cluster and access cluster client configuration mode.

## Syntax

**client** *client-name* *client-id*

**no client** *client-name* *client-id*

## Parameters

*client-name*

Specifies the client name as an ASCII string. The name can be up to 64 characters in length.

*client-id*

Specifies the cluster client ID. The ID value range can be from 1 through 512.

## Modes

Cluster client configuration mode

## Usage Guidelines

The **no** form of the command removes the client from the MCT cluster configuration.

## Examples

The following example configures a cluster client.

```
device(config)# cluster MCT1 1
device(config-cluster-1)# client MCT1-client 200
device(config-cluster-client-200)#
```

## History

Release version	Command history
16r.1.01	This command was introduced.

# client-interface

Configures a CEP or CCEP interface to the cluster client instance.

## Syntax

```
client-interface { ethernet slot/port | port-channel number }
no client-interface
```

## Parameters

**ethernet** *slot/port*

Configures the specified Ethernet port as the client CEP or CCEP.

**port-channel** *number*

Configures the specified port channel as the client CEP or CCEP. The port channel *number* specifies the LAG ID.

## Modes

Cluster client configuration mode

## Usage Guidelines

The **no** form of the command removes the client interface.

The same client interface cannot be added under multiple client entries.

A client interface is not allowed to be updated when the client is in deploy state. It needs to be removed first before adding a new interface.

## Examples

The following example shows how to configure a client interface.

```
device(config)# cluster MCT1 1
device(config-cluster-1)# client MCT1-client 200
device(config-cluster-client-200)# client-interface port-channel 3
```

## History

Release version	Command history
16r.1.01	This command was introduced.

# client-interfaces-shutdown

Disables the local client interfaces administratively in the cluster to moves all the traffic on the device to remote MCT peer device, resulting in fail-over of traffic to the peer device.

## Syntax

```
client-interfaces shutdown
```

```
no client-interfaces shutdown
```

## Modes

Cluster configuration mode

## Usage Guidelines

The **no** form of the command reenables the local client interfaces.

## Examples

The following example shows the disabling of all the client interfaces in the cluster.

```
device(config)# cluster MCT1 1
device(config-cluster-1)# client-interfaces shutdown
```

## History

Release version	Command history
16r.1.01	This command was introduced.

# client-isolation

Sets the client-isolation mode to strict when the EVPN control session goes down between the MCT devices for Broadcast, Unknown unicast and Multicast (BUM) handling over Cluster Client Edge Port (CCEP) interfaces.

## Syntax

```
client-isolation { loose | strict }
```

```
no client-isolation
```

## Command Default

Client-isolation mode is based on the peer IP address. The node with the lower peer IP address is set to the client-isolation mode of loose, while the node with the higher peer IP address is set to the client-isolation mode of strict.

## Parameters

### loose

Specifies the loose isolation mode.

### strict

Specifies the strict isolation mode.

## Modes

Cluster configuration mode

## Usage Guidelines

In strict mode, when the EVPN control session goes down, the interfaces on both the cluster devices are administratively shut down. In strict mode, the client is completely isolated from the network if the control session is not operational.

In loose mode, when the EVPN control session goes down, the peer device performs the master/slave negotiation. After negotiation, the slave shuts down its peer ports, and the master peer ports continue to forward the traffic (keep-alive VLAN configured).

MCT cluster devices can operate in two modes. Both peer devices must be configured with the same mode configuration.

### NOTE

The CLI allows modification of the client isolation mode on MCT cluster devices even when the cluster is deployed. You must have the same isolation mode configuration on both cluster devices.

The **no** form of the command resets the default client isolation mode behavior based on the peer IP address.

## Examples

The following example shows how to configure the client isolation strict mode.

```
device# configure terminal
device(config)# cluster MCT1 1
device(config-cluster-1)# client-isolation strict
```

## History

Release version	Command history
17r.1.01	This command was introduced.

# client-pw

Configures the pseudowire (PW) client for an MCT cluster used with VPLS or VLL and access cluster client PW configuration mode.

## Syntax

```
client-pw
```

```
no client-pw
```

## Modes

Cluster configuration mode

## Usage Guidelines

Only one instance of the PW client represents all VPLS or VLL PWs over all bridge domains.

The **no** form of the command removes the PW client from the MCT cluster configuration.

## Examples

The following example configures a cluster client.

```
device# configure terminal
device(config)# cluster MCT1 1
device(config-cluster-1)# client-pw
device(config-cluster-client-pw)#
```

## History

Release version	Command history
17r.1.00	This command was introduced.



# client-to-client-reflection

Enables routes from one Route Reflector (RR) client to be reflected to other clients by the host device on which it is configured.

## Syntax

`client-to-client-reflection`

`no client-to-client-reflection`

## Command Default

Enabled.

## Modes

BGP address-family IPv4 unicast configuration mode

BGP address-family IPv6 unicast configuration mode

BGP address-family L2VPN EVPN configuration mode

## Usage Guidelines

When this command is used, the host device on which it is configured becomes the route-reflector server.

The **no** form of the command disables route reflection between clients.

## Examples

The following example configures client-to-client reflection on the BGP host device for the IPv4 unicast address-family.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv4 unicast
device(config-bgp-ipv4u)# client-to-client-reflection
```

The following example disables client-to-client reflection on the BGP host device for the IPv6 unicast address-family.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv6 unicast
device(config-bgp-ipv6u)# no client-to-client-reflection
```

The following example configures client-to-client reflection in L2VPN EVPN configuration mode.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family l2vpn evpn
device(config-bgp-evpn)# client-to-client-reflection
```

## History

Release version	Command history
16r.1.00	This command was introduced.
17r.1.01	Support was added for the BGP address-family L2VPN EVPN configuration mode.

# clock set

Sets the local clock time and date.

## Syntax

```
clock set hh:mm:ss mm-dd-yy/yyyy
```

## Parameters

*hh:mm:ss*

Specifies the local clock time in hours, minutes, and seconds.

*mm-dd-yy/yyyy*

Specifies the local clock date in month, day, and year format. Year may be specified with two or four numbers.

## Modes

Privileged EXEC mode

## Usage Guidelines

Valid date and time settings range from January 1, 1970 to December 31, 2035.

An active NTP server, if configured, automatically updates and overrides the local clock time.

## Examples

The following example sets the time and date to 31 minutes past 4pm in the afternoon on July 28, 2016, for the local device:

```
device# clock set 16:31:35 07-28-16
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# clock timezone

Sets the device system clock time zone options using either Greenwich Mean time (GMT) or one of the US time zones that uses Universal Time Coordinated (UTC) plus or minus a number of hours.

## Syntax

```
clock timezone { gmt gmt-time | us us-time }
```

```
no clock timezone { gmt gmt-time | us us-time }
```

## Parameters

### **gmt** *gmt-time*

Specifies the GMT time zone. The value can be one of the following: gmt+00 (United Kingdom), gmt+01 (France, Germany), gmt+02 (Eastern Europe, South Africa), gmt+03, gmt+03:30, gmt+04, gmt+04:30, gmt+05, gmt+05:30 (India), gmt+06, gmt+06:30, gmt+07, gmt+08 (China, Hong Kong, Taiwan), gmt+09 (Japan, Korea), gmt+09:30, gmt+10 (Australia), gmt+10:30, gmt+11, gmt+11:30, gmt+12, gmt-01, gmt-02, gmt-03, gmt-03:30, gmt-04, gmt-05, gmt-06, gmt-07, gmt-08, gmt-08:30, gmt-09, gmt-09:30, gmt-10, gmt-11, gmt-12.

### **us** *us-time*

Specifies the US time zone. The value can be one of the following: alaska, aleutian, arizona, central, east-indiana, eastern, hawaii, michigan, mountain, pacific, samoa.

## Modes

Global configuration mode

## Examples

The following example sets the system date and time to the US Samoa time zone.

```
device(config)# clock timezone us samoa
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# cluster

Configures a Multi-Chassis Trunking (MCT) cluster and access the cluster configuration mode.

## Syntax

**cluster** *cluster-name cluster-id*

**no cluster** *cluster-name cluster-id*

## Parameters

*cluster-name*

Specifies the cluster name as an ASCII string. The cluster name can be up to 64 characters in length.

*cluster-id*

Specifies the cluster ID. The ID value range can be from 1 through 65535.

## Modes

Global configuration mode

## Usage Guidelines

### NOTE

The *cluster-id* variable must be the same on both cluster devices.

The **no** form of the command removes the MCT cluster configuration.

## Examples

The following example configures an MCT cluster.

```
device(config)# cluster MCT1 1
device(config-cluster-1)#
```

## History

Release version	Command history
16r.1.01	This command was introduced.

# cluster-id

Configures a cluster ID for the route reflector.

## Syntax

```
cluster-id { num | ip-addr }
```

```
no cluster-id { num | ip-addr }
```

## Command Default

The default cluster ID is the device ID.

## Parameters

*num*

Integer value for cluster ID. Range is from 1 through 65535.

*ip-addr*

IPv4 address in dotted-decimal notation.

## Modes

BGP configuration mode

## Usage Guidelines

When configuring multiple route reflectors in a cluster, use the same cluster ID to avoid loops within the cluster.

The **no** form of the command restores the default.

## Examples

The following example configures a cluster ID for the route reflector.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# cluster-id 1234
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# commit

Use the **commit** command to commit modifications done to adaptive parameters of a bypass LSP. This command also applies to LSPs. This is not a configuration persistent command; it is a functional command.

## Syntax

commit

## Command Default

Automatic commit is considered when it is configured to do so in the MPLS global mode.

## Modes

MPLS router bypass LSP configuration mode (`config-router-mpls-bypass-lsp_name`).

## Usage Guidelines

Once modifying one or more adaptive parameters, the user can commit the changes such that the new instance of the bypass LSP can be brought up. When successful, then a make-before-break switch happens from the current instance of the bypass to the new UP instance.

## Examples

The following example shows the configuration for the **commit** command.

```
device>configure
device(config)# router mpls
device(config-router-mpls)# bypass-lsp my-bypass-lsp
device(config-router-mpls-bypass-lsp-my-bypass-lsp)# commit
```

## History

Release version	Command history
17r.1.100	This command was introduced.

# compare-med-empty-aspath

Enables comparison of Multi-Exit Discriminators (MEDs) for internal routes that originate within the local autonomous system (AS) or confederation

## Syntax

```
compare-med-empty-aspath
no compare-med-empty-aspath
```

## Command Default

Disabled.

## Modes

BGP configuration mode

## Usage Guidelines

The **no** form of the command restores the default.

## Examples

The following example configures the device to compare MEDs.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# compare-med-empty-aspath
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# compare-routerid

Enables comparison of device IDs, so that the path-comparison algorithm compares the device IDs of neighbors that sent otherwise equal-length paths.

## Syntax

```
compare-routerid  
no compare-routerid
```

## Modes

BGP configuration mode

## Examples

The following example configures the device always to compare device IDs.

```
device# configure terminal  
device(config)# router bgp  
device(config-bgp-router)# compare-routerid
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# confederation identifier

Configures a BGP confederation identifier.

## Syntax

**confederation identifier** *autonomous-system number*  
**no confederation identifier**

## Command Default

No BGP confederation identifier is identified.

## Parameters

*autonomous-system number*

Specifies an autonomous system number (ASN). The configurable range of values is from 1 through 4294967295.

## Modes

BGP configuration mode

## Usage Guidelines

The **no** form of the command removes a BGP confederation identifier.

## Examples

The following example specifies that confederation 65220 belongs to autonomous system 100.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# local-as 65220
device(config-bgp-router)# confederation identifier 100
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# confederation peers

Configures subautonomous systems to belong to a single confederation.

## Syntax

**confederation peers** *autonomous-system number* [ ...*autonomous-system number* ]  
**no confederation peers**

## Command Default

No BGP peers are configured to be members of a BGP confederation.

## Parameters

*autonomous-system number*

Autonomous system (AS) numbers for BGP peers that will belong to the confederation. The configurable range of values is from 1 through 4294967295.

## Modes

BGP configuration mode

## Usage Guidelines

The **no** form of the command removes an autonomous system from the confederation.

## Examples

The following example configures autonomous systems 65520, 65521, and 65522 to belong to a single confederation under the identifier 100.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# local-as 65020
device(config-bgp-router)# confederation identifier 100
device(config-bgp-router)# confederation peers 65520 65521 65522
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# configure terminal

Enters global configuration mode.

## Syntax

`configure terminal`

## Modes

Privileged EXEC mode

# connector

Accesses connector configuration mode for the 40G port on the SLX 9850 36X100G line card (LC).

## Syntax

`connector slot/port`

## Parameters

*slot/port*

Specifies a valid slot and port number on the line card.

## Modes

Hardware configuration mode

## Usage Guidelines

In connector configuration mode, you can break out the port into four 10G ports.

Power off the line card before using this command.

## Examples

The following example shows the accessing of the connector configuration mode for a 40G port on the 36X100G LC.

```
device# power-off linecard 4
device# configure terminal
device(config)# hardware
device(config-hardware)# connector 4/2
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# copy

Copies configuration data.

## Syntax

```
copy source_file destination_file
```

## Parameters

### *source\_file*

The source file to be copied. Specify one of the following parameters:

#### **default-config**

The default configuration.

#### **running-config**

The running configuration.

#### **startup-config**

The startup configuration.

#### **flash://filename**

A file in the local flash memory.

#### **ftp://username:password@host\_ip\_address/path**

A file on a remote host. Transfer protocol is FTP.

#### **scp://username:password@host\_ip\_address/path**

A file on a remote host. Transfer protocol is SCP.

#### **sftp://username:password@host\_ip\_address/path**

A file on a remote host. Transfer protocol is SFTP.

#### **tftp://username:password@host\_ip\_address/path**

A file on a remote host. Transfer protocol is TFTP.

#### **usb://path**

A file on an attached USB device.

### *destination\_file*

The destination file. Specify one of the following parameters:

#### **default-config**

The default configuration.

#### **running-config**

The running configuration.

#### **startup-config**

The startup configuration.

#### **flash://filename**

A file in the local flash memory.

#### **ftp://username:password@host\_ip\_address//path**

A file on a remote host. Transfer protocol is FTP.

**scp://username:password@host\_ip\_address//path**  
A file on a remote host. Transfer protocol is SCP.

**sftp://username:password@host\_ip\_address/path**  
A file on a remote host. Transfer protocol is SFTP.

**tftp://username:password@host\_ip\_address/path**  
A file on a remote host. Transfer protocol is TFTP.

**usb://path**  
A file on an attached USB device.

## Modes

Privileged EXEC mode

## Usage Guidelines

Use this command to back up and restore configuration files with various protocols.

This command is supported only on the local switch.

IPv4 and IPv6 addresses are supported.

The special characters of dollar sign "\$" and exclamation point "!" can be used as part of the password variable, provided they are paired with the correct escape characters. The "\$" must be paired with two backslashes "\". For example, if your password choice was "\$password" on a remote server, you must use "username:\\\$password@1.1.1.1" for the **copy** command. The exclamation point must be paired with a single backslash in the **copy** command, such as "username:\\!password@1.1.1.1".

## Examples

To save the running configuration to a file:

```
device# copy running-config flash://myconfig
```

To overwrite the startup configuration with a locally saved configuration file:

```
device# copy flash://myconfig running-config
```

To overwrite the startup configuration with a remotely archived configuration file:

```
device# copy scp://user:password@10.10.10.10//myconfig startup-config
```

To overwrite the startup configuration with a configuration file saved on an attached USB device:

```
device# copy usb://myconfig startup-config
```

## History

Release version	Command history
16r.1.00	This command was introduced.

## COS

Configures the a Class of Service (CoS) priority value for all packets traveling through the LSP.

## Syntax

**cos** *number*

**no cos** *number*

## Parameters

*number*

Specifies the CoS priority value. Enter a number from 0 to 7. The lowest priority is 0, the default value. The highest priority is 7.

## Usage Guidelines

The 3-bit EXP field in the MPLS header defines a CoS value for packets traveling through the LSP. When you set the CoS value, it is applied to the EXP field in the MPLS header of all packets entering this LSP. Then, all packets traveling through an LSP have the same priority as they travel the MPLS domain.

The MPLS CoS value determines the priority within an MPLS domain only. When the label is pops, the CoS value in the MPLS header is discarded and it is not copied back to the IP ToS field.

Use the **no** form of the command to remove the configured setting.

## History

Release version	Command history
16r.1.00	This command was introduced.
17r.1.00	This command was modified to add the MPLS router bypass LSP configuration mode.



## COS

Configures class of service (CoS).

## Syntax

```
cos class-of-service ]
```

```
no cos
```

## Parameters:

*class-of-service*

Specifies the CoS value. The range is from 1 to 8. The default value is 7.

## Modes

Y1731 configuration mode

## Usage Guidelines

Use the **no** form of the command to delete the CoS configuration.

## Examples

This example shows how to configure CoS.

```
device# configure terminal
device (config-cfm)# protocol cfm
device (config-cfm)# y1731
device(config-cfm-y1731)# test-profile my_test_profile
device(config-cfm-y1731-test-profile-my_test_profile)# type delay-measurement
device(config-cfm-y1731-test-profile-my_test_profile)# tx-interval 60
device(config-cfm-y1731-test-profile-my_test_profile)# measurement-interval 30
device(config-cfm-y1731-test-profile-my_test_profile)# start at 00:00:00 daily
device(config-cfm-y1731-test-profile-my_test_profile)# stop at 23:59:00
device(config-cfm-y1731-test-profile-my_test_profile)# cos 7
```

## History

Release version	Command history
17r.1.01	This command was introduced.

# crypto ca authenticate

Downloads the CA certificate from the remote certificate server for the trust point.

## Syntax

```
crypto ca authenticate { trustpointCA_name directory remote_dir_name file cert_file host host_address protocol {FTP | SCP}
    user host_login password host_user_password}
```

```
no crypto ca authenticate { trustpointCA_name}
```

## Parameters

*trustpointCA\_name* *trustpointCA\_name*

Defines the name of the trust point you are authenticating. This name needs to be the same as that of the trust point created by the **crypto ca trustpoint** command. The string for the name can not be left blank. The length of the string can range from 1 through 64 characters.

**directory** *remote\_dir\_name*

Defines the directory where the certification file resides.

**file** *cert\_file*

Defines the name of the certification file.

**host** *host\_address*

Defines the host name or IP address of the remote certificate server.

**protocol** {FTP | SCP}

Specifies the use of either FTP or SCP protocol for accessing the certification file.

**user** *host\_login*

Defines user name for the host server.

**password** *host\_user\_password*

Defines the password for the user name on the host server.

### NOTE

It is recommended to not list the password in command line for security purposes; the user will be prompted for the password.

## Modes

Privileged EXEC mode

## Usage Guidelines

This is the CA certificate of the Trusted CA that you want to sign the CSR and generate the identity certificate.

The *trustpoint\_CAname* name needs to be the same as that of the trust point created by the **crypto ca trustpoint** command.

The **no** form of the command deletes the certificate.

## Examples

Typical command example.

```
device# crypto ca authenticate t1 protocol SCP host 10.70.12.102 user fvt directory /users/home/crypto
file cacert.pem
Password: *****
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# crypto ca enroll

Enrolls the trust point by generating the Certificate Signing Request (CSR) and exporting it to the remote certificate server.

## Syntax

```
crypto ca enroll { trustpointCA_name directory remote_dir_name host host_address protocol {FTP | SCP} user host_login
password host_user_password country country state state locality locality organization organization orgunit orgunit
common common_name}
```

## Parameters

*trustpointCA\_name*

Defines the name of the trust point you are enrolling. This name needs to be the same as that of the trust point created by the **crypto ca trustpoint** command. The string for the name can not be left blank. The length of the string can range from 1 through 64 characters.

**directory** *remote\_dir\_name*

Defines the path of the directory to export the Certificate Signing Request.

**host** *host\_address*

Defines the host name or IP address of the remote certificate server.

**protocol** {FTP | SCP}

Specifies the use of either FTP or SCP protocol for exporting the certification file.

**user** *host\_login*

Defines user name for the host server.

**password** *host\_user\_password*

Defines the password for the user name on the host server.

### NOTE

It is recommended to not list the password in command line for security purposes; the user will be prompted for the password.

**country** *country*

Defines the two-letter country code for generating the CSR.

**state** *state*

Defines the state name for generating the CSR.

**locality** *locality*

Defines the locality name for generating the CSR.

**organization** *organization*

Defines the organizational unit name for generating the CSR.

**orgunit** *orgunit*

Defines the name of the certification file.

**common** *common\_name*

This is the name used to connect to the device through HTTPS. Enter a Fully Qualified Domain Name (FQDN) or IP address. If a FQDN is used, you need to configure a domain name and name server on the device.

## Modes

Privileged EXEC mode

## Usage Guidelines

The *trustpoint\_CAname* name needs to be the same as that of the trust point created by the **crypto ca trustpoint** command.

## Examples

Typical command example:

```
device# crypto ca enroll t1 country US state CA locality SJ organization BRC orgunit SFI common
myhost.extreme.com protocol SCP host 10.70.12.102 user fvt directory /proj/crypto
Password: *****
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# crypto ca import

Imports the Identity Certificate for HTTPS security configuration.

## Syntax

```
crypto ca import { trustpointCA_name certificate directory remote_dir_name file cert_file host host_address protocol {FTP |
  SCP} user host_login password host_user_password}
```

```
no crypto ca import {trustpointCA_name}
```

## Parameters

*trustpointCA\_name*

Defines the name of the trust point you are authenticating. This name needs to be the same as that of the trust point created by the **crypto ca trustpoint** command. The string for the name can not be left blank. The length of the string can range from 1 through 64 characters.

**certificate directory** *remote\_dir\_name*

Defines the directory where the certification file resides.

**file** *cert\_file*

Defines the name of the certification file.

**host** *host\_address*

Defines the host name or IP address of the remote certificate server.

**protocol** {FTP | SCP}

Specifies the use of either FTP or SCP protocol for accessing the certification file.

**user** *host\_login*

Defines user name for the host server.

**password** *host\_user\_password*

Defines the password for the user name on the host server.

### NOTE

It is recommended to not list the password in command line for security purposes; the user will be prompted for the password.

## Modes

Privileged EXEC mode

## Usage Guidelines

The *trustpoint\_CAname* name needs to be the same as that of the trust point created by the **crypto ca trustpoint** command.

Use the no form of the command to remove the Identity Certificate.

## Examples

Typical command example:

```
device# crypto ca import t1 certificate protocol SCP host 10.70.12.102 user fvt directory /users/crypto
file cacert.pem
Password: *****
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# crypto ca trustpoint

Defines the trust point for HTTPS security configuration.

## Syntax

`crypto ca trustpoint trustpointCA_name`

`no crypto ca trustpoint trustpointCA_name`

## Parameters

*trustpointCA\_name*

Defines the name of the trust point. The string for the name can not be left blank. The length of the string can range from 1 through 64 characters.

## Modes

Global configuration mode

## Usage Guidelines

Use the `no crypto ca trustpoint` command to remove the trust point.

## Examples

Typical command example:

```
device(config)# crypto ca trustpoint t1
```

Example using the no form of the command:

```
device(config)# no crypto ca trustpoint t1
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# crypto key

Generates an RSA/ECDSA/DSA key pair to sign or encrypt and decrypt the security payload during security protocol exchanges for applications. You must sign and/or encrypt and decrypt the RSA/ECDSA/DSA key pair before you obtain a certificate for your device.

## Syntax

```
crypto key label key_label [rsa | ecdsa | dsa] [modulus key_size]
```

```
no crypto key label key_label
```

## Parameters

**label** *key\_label*

The name of the key pair.

**rsa**

Generates an RSA key pair.

**ecdsa**

Generates an ECDSA key pair.

**dsa**

Generates a DSA key pair.

**modulus** *key\_size*

Specifies the key size. The corresponding key sizes supported for each key type are:

- RSA: 1024 or 2048
- DSA: 1024
- ECDSA: 256,384, or 521

## Modes

Global configuration mode

## Usage Guidelines

Use the no form of this command to remove the key pair.

The key label must contain alphanumeric characters.

## Examples

Typical command example for generating the key pair.

```
device(config)# crypto key label k1 rsa modulus 2048
device(config)# do show running-config crypto
crypto key label k1 rsa modulus 2048
```

crypto key

The following is an example of using the no form of the command:

```
device(config)# no crypto key label k1
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# csnp-interval

Configures the Complete Sequence Number PDU (CSNP) interval.

## Syntax

```
csnp-interval secs
no csnp-interval
```

## Command Default

The default CSNP interval is 10 seconds.

## Parameters

**secs**  
Specifies the interval in seconds. Valid values range from 0 through 65535 seconds.

## Modes

IS-IS router configuration mode

## Usage Guidelines

The interval configured on the device applies to both Level 1 and Level 2 CSNPs and Partial Sequence Number PDUs (PSNPs).

The **no** form of the command restores the default value.

## Examples

The following example configures a CSNP interval of 25 seconds.

```
device# configure terminal
device(config)# router isis
device(config-isis-router)# csnp-interval 25
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# cspf-computation-mode

The path calculation metric implementation allows you to specify the path calculation for a given tunnel.

## Syntax

```
cspf-computation-mode { [ ignore-overload-bit | metric-type [ use-bypass-metric | use-igp-metric | use-te-metric ] ] }
no cspf-computation-mode { [ ignore-overload-bit | metric-type [ use-bypass-metric | use-igp-metric | use-te-metric ] ] }
```

## Command Default

By default, all LSPs use the TE-metric global configuration.

## Parameters

### ignore-overload-bit

Ignores the overload bit during CSPF computation.

### metric-type

Select for CSPF computation.

### use-bypass-metric

Use the bypass metric to enable the bypass path cost for the backup path.

### use-igp-metric

Use to configure the metric plane to IGP-configured metric while computing the CSPF path.

### use-te-metric

Use to configure the metric plane to the TE-configured metric while computing the CSPF path.

## Modes

Global level (config-router-mpls-policy): This configuration covers all RSVP LSPs (primary, secondary LSPs).

MPLS router bypass LSP configuration mode. (config-router-mpls-bypass-lsp)

Individual LSP mode: This configuration covers all RSVP LSPs.

MPLS router MPLS interface dynamic bypass configuration mode (config-router-mpls-if-ethernet-slot/port-dynamic-bypass).

## Usage Guidelines

The CLI configuration at the LSP level always overrides the configuration at the global level. That is, the decision to **use-te-metric** or **use-igp-metric** for CSPF path calculation if configured at the LSP level, always overrides the configuration at the global level.

The user can configure the CSPF computation mode for the CSPF Path calculation of dynamic bypass LSPs that get created. CSPF can make use of either the TE-metric as cost or the IGP metric as cost for the shortest path first algorithm.

The **no** form of the command removes the CSPF computation mode.

## Examples

In the following example, the CSPF computation mode is set back to a default value of the **te-metric** at the global level.

```
device# configure
device(config)# router-mpls
device(config-router-mpls)# policy
device(config-router-mpls-policy)# cspf-computation-mode metric-type use-igp-metric
device(config-router-mpls-policy)# no cspf-computation-mode metric-type use-te-metric
Error:CSPF computation is configured to use igp-metric
device(config-router-mpls-policy)# no cspf-computation-mode metric-type use-igp-metric
```

In the following example, the CSPF computation mode is set back to a default value of the **use-te-metric** at the LSP level.

```
device# configure
device(config)# router mpls
device(config-router-mpls)# lsp test
device(config-router-mpls-lsp-test)# cspf-computation-mode metric-type use-igp-metric
device(config-router-mpls-policy)# no cspf-computation-mode metric-type use-te-metric
Error:CSPF computation is configured to use-igp-metric
device(config-router-mpls-policy)# no cspf-computation-mode metric-type use-igp-metric
```

In the following example, both the cost and number of riding backups are considered using the **use-bypass-metric** command.

```
device# configure
device(config)# router-mpls
device(config-router-mpls)# policy
device(config-router-mpls-policy)# cspf-computation-mode metric-type use-bypass-metric
```

In the following example, both the cost and number of riding backups are considered using the **use-igp-metric** command for dynamic bypass MPLS Ethernet interface 2/8.

```
device# configure
device(config)# router-mpls
device(config-router-mpls)# mpls-interface ethernet 2/8
device(config-router-mpls-if-ethernet-2/8)# dynamic-bypass
device(config-router-mpls-if-ethernet-2/8-dynamic-bypass)# cspf-computaion-mode use-igp-metric
```

## History

Release version	Command history
16r.1.00	This command was introduced.
17r.1.00	This command was modified to include the <b>use-bypass-metric</b> option and dynamic bypass information.

# cspf-interface-constraint

Forces the CSPF calculation to include any specified interface when creating an LSP.

## Syntax

`cspf-interface-constraint`

`no cspf-interface-constraint`

## Command Default

The command is disabled, by default.

## Modes

MPLS policy mode.

## Usage Guidelines

The command may be dynamically turned on or off. Turning the command off or on has no effect on LSPs that have already been established (primary and secondary). For LSPs that are currently retried, changing the constraint setting changes the behavior on the next retry such as when an LSP whose path is configured to use that interface fails to come up due to an interface down condition.

The command has significance for the ingress node only, where the CSPF calculation takes place for an LSP or a detour segment.

The **no** form of the command disables the configuration.

## Examples

The following example configures the command.

```
device# configure
device(config)# router mpls
device(config-router-mpls)# policy
device(config-router-mpls-policy)# cspf-interface-constraint
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# cspf-group

Configures a CSPF fate-sharing group by assigning a name to the group.

## Syntax

```
cspf-group { group_name }
no cspf-group
```

## Command Default

The command is disabled by default.

## Parameters

*group\_name*

Specifies the name of the fate-sharing group. The group-name variable can be up to 128 characters. The objects that can be specified for a fate-sharing group are interface, point-to-point link, node, and subnet.

## Modes

MPLS router mode.

## Usage Guidelines

The **no** form of the command disables the command.

## Examples

The following example assigns the name *group3* to the fate sharing group configuration.

```
device# configure
device(config)# router mpls
device(config-router-mpls)# cspf-group group3
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# cspf-group-computation

Use the `cspf-group-computation` mode when setting up a fate-sharing group.

## Syntax

```
cspf-group-computation [ add-penalty | ignore-overload-bit | metric-type [ use-igp-metric | use-te-metric ] | use-bypass-metric ]
```

```
no cspf-group-computation
```

## Command Default

The CSPF group computation mode is disabled, by default.

## Parameters

### `add-penalty`

Adds penalty of all matching cspf-groups to TE metric of the TE link.

### `ignore-overload-bit`

Ignores the overload bit during CSPF computation.

### `metric-type`

Selects the metric type for CSPF computation.

#### `use-igp-metric`

Uses the IGP metric of the link for CSPF computation.

#### `use-te-metric`

Uses the TE metric of the link for CSPF computation.

### `use-bypass-metric`

Uses the bypass LSPs path cost for the selection between bypass LSPs

## Modes

MPLS policy configuration mode (`config-router-mpls-policy`).

## Usage Guidelines

The `no` form of the command disables the CSPF group computation mode.

## Examples

The following example specifies the CSPF-group computation for a fate-sharing group, and enables the `add-penalty` option.

```
device# configure
device(config)# router mpls
device(config-router-mpls)# policy
device(config-router-mpls-policy)# cspf-group-computation add-penalty
```



The following example enables the liberal mode of the bypass LSP selection.

```
device# configure
device(config)# router mpls
device(config-router-mpls)# policy
device(config-router-mpls-policy)# cspf-group-computation use-bypass-liberal
```

## History

Release version	Command history
16r.1.00	This command was introduced.
17r.1.00	This command was modified to include the <b>use-bypass-liberal</b> option.

# dampening

Sets dampening parameters for the route in BGP address-family mode.

## Syntax

```
dampening { half-life reuse suppress max-suppress-time | route-map route-map }
no dampening
```

## Command Default

Disabled.

## Parameters

*half-life*

Number of minutes after which the route penalty becomes half its value. Range is from 1 through 45. Default is 15.

*reuse*

Minimum penalty below which the route becomes usable again. Range is from 1 through 20000. Default is 750.

*suppress*

Maximum penalty above which the route is suppressed by the device. Range is from 1 through 20000. Default is 2000.

*max-suppress-time*

Maximum number of minutes a route can be suppressed by the device. Range is from 1 through 255. Default is 40.

*route-map*

Enables selection of dampening values established in a route map by means of the **route-map** command.

*route-map*

Name of the configured route map.

## Modes

BGP address-family IPv4 unicast configuration mode

BGP address-family IPv6 unicast configuration mode

## Usage Guidelines

Use the **no** form of this command to disable dampening.

Use **dampening** without operands to set default values for all dampening parameters.

To use the dampening values established in a route map, configure the route map first, and then enter the **route-map** command, followed by the name of the configured route map.

A full range of dampening values (*half-life*, *reuse*, *suppress*, *max-suppress-time*) can also be set by means of the **set as-path prepend** command.

## Examples

The following example enables default dampening as an IPv4 address-family function.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv4 unicast
device(config-bgp-ipv4u)# dampening
```

The following example changes all the dampening values as an IPv6 address-family function.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv6 unicast
device(config-bgp-ipv6u)# dampening 20 200 2500 40
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# database-overflow-interval (OSPFv2)

Configures frequency for monitoring database overflow.

## Syntax

```
database-overflow-interval interval  
no database-overflow-interval
```

## Command Default

0 seconds. If the device enters OverflowState, you must reboot before the device leaves this state.

## Parameters

*interval*

Time interval at which the device checks to see if the overflow condition has been eliminated. Valid values range from 0 through 86400 seconds.

## Modes

OSPF router configuration mode  
OSPF router VRF configuration mode

## Usage Guidelines

This command specifies how long a device that has entered the OverflowState waits before resuming normal operation of external LSAs. However, if the external link state database (LSDB) is still full, the device lapses back into OverflowState. If the configured value of the database overflow interval is zero, then the device never leaves the database overflow condition.

When the maximum size of the LSDB is reached (this is a configurable value in the *external-lsdb-limit* CLI), the device enters OverflowState. In this state, the device flushes all non-default AS-external-LSAs that the device had originated. The device also stops originating any non-default external LSAs. Non-default external LSAs are still accepted if there is space in the database after flushing. If no space exists, the Non-default external LSAs are dropped and not acknowledged.

The **no** form of the command disables the overflow interval configuration.

## Examples

The following example configures a database-overflow interval of 60 seconds.

```
device# configure terminal  
device(config)# router ospf  
device(config-router-ospf-vrf-default-vrf)# database-overflow-interval 60
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# database-overflow-interval (OSPFv3)

Configures frequency for monitoring database overflow.

## Syntax

```
database-overflow-interval interval  
no database-overflow-interval
```

## Command Default

10 seconds. If the router enters OverflowState, you must reboot before the router leaves this state.

## Parameters

*interval*  
Time interval at which the device checks to see if the overflow condition has been eliminated. Valid values range from 0 through 86400 seconds (24 hours).

## Modes

OSPFv3 router configuration mode  
OSPFv3 router VRF configuration mode

## Usage Guidelines

This command specifies how long after a router that has entered the OverflowState before it can resume normal operation of external LSAs. However, if the external link state database (LSDB) is still full, the router lapses back into OverflowState.

When the maximum size of the LSDB is reached (this is a configurable value in the *external-lsdb-limit* CLI), the router enters OverflowState. In this state, the router flushes all non-default AS-external-LSAs that the router had originated. The router also stops originating any non-default external LSAs. Non-default external LSAs are still accepted if there is space in the database after flushing. If no space exists, the Non-default external LSAs are dropped and not acknowledged.

The **no** form of the command disables the overflow interval configuration.

## Examples

The following example configures a database-overflow interval of 120 seconds.

```
device# configure terminal  
device(config)# ipv6 router ospf  
device(config-ipv6-router-ospf-vrf-default-vrf)# database-overflow-interval 120
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# debug access-list-log buffer

Configures or clears the ACL buffer.

## Syntax

```
debug access-list-log buffer { circular | linear } packet-count count-value
```

```
debug access-list-log buffer clear
```

```
no debug access-list-log buffer
```

## Parameters

**circular**

Specifies circular buffer type.

**linear**

Specifies linear buffer type.

**packet-count** *count-value*

Specifies a value from 64 through 2056.

**clear**

Clears the buffer contents.

## Modes

Privileged EXEC mode

## Usage Guidelines

D diagnostic commands are developed and intended for specialized troubleshooting. Please work closely with Extreme Networks technical support in running **debug** or **show system internal** commands and interpreting their results.

Use the **no** form of this command to disable debugging.

## Examples

The following example clears the buffer.

```
device# debug access-list-log buffer clear
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# debug arp packet buffer

Configures or clears the ARP-packet buffer.

## Syntax

```
debug arp packet buffer all
no debug arp packet buffer all
debug arp packet buffer { circular | linear } packet-count num-packets [ vrf vrf-name ]
debug arp packet buffer clear [ vrf vrf-name ]
debug arp packet buffer interface { ethernet slot / port | port-channel number | ve ve-id } [ rx | tx ]
no debug arp packet buffer interface { ethernet slot / port | port-channel number | ve ve-id } [ rx | tx ]
```

## Parameters

**all**  
Specifies all ARP-packet buffers.

**circular**  
Specifies circular buffer type.

**linear**  
Specifies linear buffer type.

**packet-count** *num-packets*  
Specifies a value from 64 through 2056.

**clear**  
Clears the buffer contents.

**vrf** *vrf-name*  
Specifies the name of the VRF instance. If this option is not used, details for the default VRF are shown in the output.

**interface**  
Specifies an Ethernet or port-channel interface.

**ethernet**  
Specifies a physical Ethernet interface.

*slot*  
Specifies a valid slot number.

*port*  
Specifies a valid port number.

**port-channel** *number*  
Specifies a port-channel interface. The range is from 1 through 6144.

**ve** *ve-id*  
Specifies a virtual ethernet (VE) interface.

**rx**  
Specifies whether to capture only transmitted packets.

**tx**

Specifies whether to capture received packets.

## Modes

Privileged EXEC mode

## Usage Guidelines

Diagnostic commands are developed and intended for specialized troubleshooting. Please work closely with Extreme Networks technical support in running **debug** or **show system internal** commands and interpreting their results.

If neither **rx** nor **tx** are specified, both transmitted and received packets are captures.

To disable ARP packet capture on a specified interface, use the **no debug dhcp packet buffer interface** command.

To disable ARP packet capture on all interfaces, use the **no debug dhcp packet buffer all** command.

## Examples

The following command enables ARP packet capture for transmitting data on Ethernet interface 1/5.

```
device# debug arp packet buffer interface ethernet 1/5 tx
```

The following command disables ARP packet capture on all interface.

```
device# no debug arp packet buffer all
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# debug dhcp packet buffer

Configures a buffer to capture DHCP packets.

## Syntax

```
debug dhcp packet buffer [all | circular packet count | clear vrf name | interface ethernet/port-channel | linearpacket count]
```

## Command Default

The buffer wraps around to overwrite earlier captures (circular).

## Parameters

### circular

Buffer wraps around to overwrite earlier captures.

### linear

Buffer stops capture when the packet-count value is reached.

### clear

Clears the packet buffer.

### all

Captures DHCP packets on all interfaces.

### interface

Represents a valid interface such as Ethernet or port channel.

## Modes

Privileged EXEC mode

## Usage Guidelines

D diagnostic commands are developed and intended for specialized troubleshooting. Please work closely with Extreme Networks technical support in running **debug** or **show system internal** commands and interpreting their results.

This command configures the capturing buffer behavior by allowing captures to wrap and overwrite earlier captures or stop capturing when a packet-count limit is reached. The current buffer content is cleared when the configuration changes.

Use the **no** form of this command to disable debugging.

## Examples

The following example configures a buffer to capture 510 maximum packets in a circular fashion.

```
device# debug dhcp packet buffer circular packet-count 510
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# debug dot1x packet

Displays processing information related to IEEE 802.1X port-based access control.

## Syntax

```
debug dot1x packet { all | interface ethernet slot/port } [ detail ] [ both | rx | tx ]  
no debug dot1x packet { all | interface ethernet slot/port }
```

## Parameters

### all

Causes the display of information for all interfaces.

### interface

Causes the display of information for a specific interface.

### ethernet *slot/port*

Specifies an Ethernet interface in slot and port number format; when the device does not contain slots, the slot number must be 0.

### detail

Causes the display of detailed information.

### both

Causes the display of information about received and transmitted packets. By default, information about both received and transmitted packets is displayed.

### rx

Causes the display of information about only received packets.

### tx

Causes the display of information about only transmitted packets.

## Modes

Privileged EXEC mode

## Usage Guidelines

Diagnostic commands are developed and intended for specialized troubleshooting. Please work closely with Extreme Networks technical support in running **debug** or **show system internal** commands and interpreting their results.

The **no** form of the command disables the display of processing information related to IEEE 802.1X port-based access control.

debug dot1x packet

## Examples

The following example shows how to display detailed processing information related to IEEE 802.1X port-based access control for all interfaces.

```
device# debug dot1x packet all detail
```

```
2017/04/26-04:16:35.131863 [DOT1X]: [EAP-Request]: TX SA(609c.9f5a.251e) DA(0180.c200.0003) Port:  
Ethernet 0/6 Type: Identity
```

The following example shows how to disable the display of processing information related to IEEE 802.1X port-based access control for port 0/1.

```
device# no debug dot1x packet interface ethernet 0/1
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# debug ip bgp

Displays information related to the processing of BGP4, with a variety of options.

## Syntax

```
debug ip bgp { cli | dampening | events | general | graceful-restart | ip-prefix ip-addr/mask-len | ip-prefix-list name |
  keepalives | route-map name | route-selection | traces | updates [ rx | tx ] } [ all-vrfs | vrf vrf-name ]
```

```
no debug ip bgp
```

## Parameters

### cli

Displays information about BGP CLI

### dampening

Displays BGP4 dampening.

### events

Displays all BGP4 events.

### general

Displays BGP4 common events.

### graceful-restart

Displays BGP graceful restart events.

### ip-prefix

Displays information filtered by IP prefix.

*ip-addr*

IPv4 address in dotted-decimal notation.

*mask-len*

IPv4 mask length in CIDR notation.

### ip-prefix-list

Displays information filtered by IP prefix list.

*name*

Name of IP prefix list.

### keepalives

Displays BGP4 keepalives.

### route-map

Displays configured route map tags.

*name*

Name of route map.

### route-selection

Displays BGP4 route selection.

### traces

Displays BGP traces.

**updates**

Displays BGP4 updates.

**rx**

Displays BGP4 received updates.

**tx**

Displays BGP4 transmitted updates

**all-vrfs**

Specifies all VRFs.

**vrf**

Specifies a VRF instance or all VRFs.

*vrf-name*

Specifies a VRF instance

## Modes

Privileged EXEC mode

## Usage Guidelines

Diagnostic commands are developed and intended for specialized troubleshooting. Please work closely with Extreme Networks technical support in running **debug** or **show system internal** commands and interpreting their results.

If you want to see BGP4 keepalives for a specific neighbor, you must first specify the neighbor using the **debug ip bgp neighbor** command. Only keepalive traces for the specified neighbor will appear in the debugging message.

The **no** form of the command disables debugging.

## Examples

The following example sets debugging on BGP4 events.

```
device# debug ip bgp events
```

The following example sets debugging on BGP4 graceful restart events.

```
device# debug ip bgp graceful-restart
```

The following example specifies that BGP4 keepalives for a specified neighbor appear in debugging messages.

```
device# debug ip bgp keepalive
device# debug ip bgp neighbor 10.1.1.1
```

The following example sets debugging on BGP4 events for VRF instance "red".

```
device# debug ip bgp events vrf red
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# debug ip bgp neighbor

Displays information related to the processing of BGP4 for a specific neighbor.

## Syntax

```
debug ip bgp neighbor ip-addr [ all-vrfs | vrf vrf-name ]
no debug ip bgp neighbor ip-addr [ all-vrfs | vrf vrf-name ]
```

## Parameters

*ip-addr*  
IPv4 address in dotted-decimal notation.

**all-vrfs**  
Specifies all VRFs.

**vrf**  
Specifies a VRF instance or all VRFs.

*vrf-name*  
Specifies a VRF instance.

## Modes

Privileged EXEC mode

## Usage Guidelines

Diagnostic commands are developed and intended for specialized troubleshooting. Please work closely with Extreme Networks technical support in running **debug** or **show system internal** commands and interpreting their results.

The **no** form of the command disables debugging.

## Examples

The following example sets debugging on information related to the processing of BGP4 for a specific neighbor.

```
device# debug ip bgp neighbor 10.11.12.13
```

The following example specifies that BGP4 keepalives for a specified neighbor appear in debugging messages.

```
device# debug ip bgp keepalive
device# debug ip bgp neighbor 10.1.1.1
```

The following example sets debugging on information related to the processing of BGP4 for a specific neighbor for VRF instance "red".

```
device# debug ip bgp neighbor 10.11.12.13 vrf red
```

The following example sets debugging information related to the processing of BGP4 for a specific neighbor for all VRFs.

```
device# debug ip bgp neighbor 10.11.12.13 all-vrfs
```

debug ip bgp neighbor

## History

Release version	Command history
16r.1.00	This command was introduced.

# debug ip igmp

Enables or disables debugging for IGMP information.

## Syntax

```
debug ip igmp { all | errors | group A.B.C.D | packet | rx | tx | interface ethernet | port-channel tunnel | vlan vlan_id }
no debug ip igmp
```

## Parameters

### all

Enables all debugs.

### errors

Enables only error type debugs, such as memory allocation failures etc.

### group A.B.C.D

Specifies the group address, as a subnet number in dotted decimal format (for example, 10.0.0.1), as the allowable range of addresses included in the multicast group.

### packet

Enables debug for query/reports per the chosen option.

### rx

Specifies only ingressing flow debugs to be captured in traces.

### tx

Specifies only egressing packet flows to be captured in traces.

### interface

Specifies the interface (ethernet, port-channel, tunnel) to be monitored.

### vlan

Specifies the VLAN to be monitored.

## Modes

Privileged EXEC mode

## Usage Guidelines

Diagnostic commands are developed and intended for specialized troubleshooting. Please work closely with Extreme Networks technical support in running **debug** or **show system internal** commands and interpreting their results.

When debugging is enabled, all of the IGMP packets received and sent and IGMP-host related events are displayed.

Use the **no** form of this command to disable debugging.

debug ip igmp

## History

Release version	Command history
16r.1.00	This command was introduced.

# debug ip pim

Enables debugging for IP Protocol Independent Multicast.

## Syntax

```
debug ip pim { add-del-oif | bootstrap | group | join-prune | nbr-change | packets | parent | regproc | route-change | rp |  
source | state | all }
```

```
no debug ip pim all
```

## Command Default

All flags are disabled.

## Parameters

### add-del-oif

Controls the OIF change flag.

### bootstrap

Controls the bootstrap processing flag.

### group

Controls the processing for a group flag.

### join-prune

Controls the Join/Prune processing flag.

### nbr-change

Controls the neighbor changes flag.

### packets

Controls the packet processing flag.

### parent

Controls the parent change processing flag.

### regproc

Controls the register processing flag.

### route-change

Controls the route changes flag.

### rp

Controls the Rendezvous Point (RP) processing flag.

### source

Controls the processing for a source flag.

### state

Controls the state processing flag.

### all

Controls all of the states.

## Modes

Privileged EXEC mode

## Usage Guidelines

Diagnostic commands are developed and intended for specialized troubleshooting. Please work closely with Extreme Networks technical support in running **debug** or **show system internal** commands and interpreting their results.

Use the **no debug ip pim all** command to disable debugging.

## History

Release version	Command history
16r.1.00	This command was introduced.

# debug ipv6 bgp

Displays debug information related to BGP processing for IPv6 prefix lists.

## Syntax

```
debug ipv6 bgp ipv6-prefix ipv6-address /mask [ all-vrfs | vrf vrf-name ]
debug ipv6 bgp ipv6-prefix name [ all-vrfs | vrf vrf-name ]
debug ipv6 bgp ipv6-prefix-list name [ all-vrfs | vrf vrf-name ]
no debug ipv6 bgp ipv6-prefix ipv6-address /mask [ all-vrfs | vrf vrf-name ]
no debug ipv6 bgp ipv6-prefix name [ all-vrfs | vrf vrf-name ]
no debug ipv6 bgp ipv6-prefix-list name [ all-vrfs | vrf vrf-name ]
```

## Parameters

*ipv6-address /mask*  
Specifies an IPv6 address and network mask.

**all-vrfs**  
Specifies all VRFs.

**vrf**  
Specifies a VRF instance or all VRFs.

*vrf-name*  
Specifies a VRF instance

*name*  
Specifies a prefix list name.

## Modes

Privileged EXEC mode

## Usage Guidelines

Diagnostic commands are developed and intended for specialized troubleshooting. Please work closely with Extreme Networks technical support in running **debug** or **show system internal** commands and interpreting their results.

Use the **no** form of this command to disable debugging.

## Examples

This example enables debugging for IPv6 prefix list "myv6list" for VRF instance "red".

```
device# debug ipv6 bgp ipv6-prefix-list myv6list vrf red
```

This example enables debugging for a specified IPv6 address for all VRFs.

```
device# debug ipv6 bgp ipv6-prefix 2001::/16 all-vrfs
```

debug ipv6 bgp

## History

Release version	Command history
16r.1.00	This command was introduced.



# debug ipv6 bgp neighbor

Displays debug information related to BGP processing for a specified neighbor.

## Syntax

```
debug ipv6 bgp neighbor ipv6-addr [ all-vrfs | vrf vrf-name ]
no debug ipv6 bgp neighbor ipv6-addr [ all-vrfs | vrf vrf-name ]
```

## Parameters

*ipv6-addr*  
IPv6 address of a neighbor.

**all-vrfs**  
Specifies all VRFs.

**vrf**  
Specifies a VRF instance or all VRFs.

*vrf-name*  
Specifies a VRF instance.

## Modes

Privileged EXEC mode

## Usage Guidelines

Diagnostic commands are developed and intended for specialized troubleshooting. Please work closely with Extreme Networks technical support in running **debug** or **show system internal** commands and interpreting their results.

The **no** form of the command disables debugging.

## Examples

The following example sets debugging for a neighbor.

```
device# debug ipv6 bgp neighbor 2000::1
```

The following example specifies that BGP keepalives for a specified neighbor appear in debugging messages.

```
device# debug ip bgp keepalive
device# debug ipv6 bgp neighbor 2001::1
```

The following example sets debugging for a neighbor for VRF instance "red".

```
device# debug ipv6 bgp neighbor 2000::1 vrf red
```

The following example sets debugging for a neighbor for all VRFs.

```
device# debug ipv6 bgp neighbor 2000::1 all-vrfs
```

debug ipv6 bgp neighbor

## History

Release version	Command history
16r.1.00	This command was introduced.

# debug lacp

Enables or disables debugging for the Link Aggregation Control Protocol (LACP).

## Syntax

```
debug lacp { all | cli | event | ha | pdu [ rx { all | interface ethernet slot/port | tx { all | sync | timer | trace level number } ] }
no debug lacp
```

## Command Default

LACP debugging is disabled.

## Parameters

<b>all</b>	Turns on all debugging.
<b>cli</b>	Turns on command line interface debugging.
<b>event</b>	Turns on event debugging.
<b>ha</b>	Echo HA events to the console.
<b>pdu</b>	Echo PDU content to the console.
<b>rx all</b>	Turns on debugging for received LACP packets on all interfaces.
<b>rx interface</b>	Turns on debugging for received LACP packets on the specified interface.
<b>interface</b>	Specifies the interface to be monitored.
<b>ethernet</b>	Represents a valid, physical Ethernet interface.
<i>slot</i>	Specifies a valid slot number. The only valid value is 0.
<i>port</i>	Specifies a valid port number.
<b>tx all</b>	Turns on debugging for transmitted LACP packets on all interfaces.
<b>tx interface</b>	Turns on debugging for transmitted LACP packets on the specified interface.

**sync**

Echo synchronization to consoles.

**timer**

Echo timer expiration to console.

**trace level** *number*

Specifies the trace level number. Valid values range from 1 through 7.

## Modes

Privileged EXEC mode

## Usage Guidelines

Enter **terminal monitor** to display debugging outputs on a particular cmsh session.Enter **no debug lacp** to disable LACP debugging.

## Examples

To enable debugging of LACP PDUs for transmitted and received packets on all interfaces:

```
device# debug lacp pdu tx all
```

```
device # debug lacp pdu rx all
```

```
device# show debug lacp
LACP rx debugging is on
LACP tx debugging is on
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# debug lldp dump

Dumps debugging information for the Link Layer Discovery Protocol (LLDP) to the console.

## Syntax

```
debug lldp dump { all | [ ethernet slot/port ] [ both ] } [ detail [ both | rx | tx ] }
```

## Command Default

LLDP debugging is disabled.

## Parameters

### all

Dumps all information to the console.

### ethernet

Represents a valid, physical Ethernet port.

### slot

Specifies a valid slot number. The only valid value is 0.

### port

Specifies a valid port number.

### both

Turns on debugging for both transmit and receive packets.

### detail

Turns on debugging with detailed information.

### both

Turns on detailed debugging for both transmit and receive packets.

### rx

Turns on detailed debugging for only received LLDP packets.

### tx

Turns on detailed debugging for only transmitted LLDP packets.

## Modes

Privileged EXEC mode

## Examples

Typical use of this command.

```
device# debug lldp dump all
LLDP Interface Debug Information for 0/2
Admin Status:  RX_TX
Associated Profile:
Link-level FCoE Priority: 0x08 (Configured: No)
Link-level iSCSI Priority: 0x10 (Configured: No)
Link Properties:
  CEE Incapable
  FCoE LLS not Ready
  FCF-Forward Disabled
Sending TLVs:
  CHASSIS_ID: 0x50ebla173ff1 (MAC)
  PORT_ID: 0/2 (IF Name)
  TTL: Hold (4) x Interval (30)
  SYSTEM_NAME
  IEEE_DCBX
  DCBX_FCOE_APP
  DCBX_FCOE_LOGICAL_LINK
  Configured FCoE App
  Configured FCoE Link
  DCBX_CTRL
<truncated>
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# debug lldp packet

Enables or disables debugging for the Link Layer Discovery Protocol (LLDP).

## Syntax

```
debug lldp packet { all | [ ethernet slot/port ] [ both ] } [ detail [ both | rx | tx ] }  
no debug lldp packet { all | interface ethernet slot/port }
```

## Command Default

LLDP debugging is disabled.

## Parameters

### all

Turns on LLDP packet debugging on all interfaces.

### ethernet

Represents a valid, physical Ethernet port.

### slot

Specifies a valid slot number.

### port

Specifies a valid port number.

### both

Turns on debugging for both transmit and receive packets.

### detail

Turns on debugging with detailed information.

### both

Turns on detailed debugging for both transmit and receive packets.

### rx

Turns on detailed debugging for only received LLDP packets.

### tx

Turns on detailed debugging for only transmitted LLDP packets.

## Modes

Privileged EXEC mode

## Usage Guidelines

Enter **terminal monitor** to display debugging outputs on a particular cmsh session.

Enter **no debug lldp packet** to disable LLDP debugging.

## Examples

To enable debugging of LLDP for both received and transmitted packets on the 10-gigabit Ethernet interface 0/1:

```
device# debug lldp packet interface ethernet 0/1 both
```

```
device# show debug lldp
```

```
LLDP debugging status:  
Interface 0/1      : Transmit Receive
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# debug spanning-tree

Enables debugging for the Spanning Tree Protocol (STP).

## Syntax

```
debug spanning-tree { all | bpdu [ rx | tx [ all | [ interface { ethernet slot/port | port-channel number } ] ] ] }
no debug spanning-tree { all | bpdu [ rx | tx [ all | [ interface { ethernet slot/port | port-channel number } ] ] ] }
```

## Command Default

STP debugging is disabled.

## Parameters

- all**  
Turns on spanning tree packet debugging on all interfaces.
- bpdu**  
Turns on Bridge Protocol Data Unit debugging.
- rx**  
Turns on debugging for only received spanning-tree packets.
- tx**  
Turns on debugging for only transmitted spanning-tree packets.
- interface**  
Specifies an interface.
  - ethernet**  
Specifies an Ethernet interface.
  - slot*  
Specifies a valid slot number. Must be 0 if the switch does not contain slots.
  - port*  
Specifies a valid port number.
  - port-channel *number***  
Specifies a port-channel. The number of available channels ranges from 1 through 6144.

## Modes

Privileged EXEC mode

## Usage Guidelines

Diagnostic commands are developed and intended for specialized troubleshooting. Please work closely with Extreme Networks technical support in running **debug** or **show system internal** commands and interpreting their results.

Enter **terminal monitor** to display debugging outputs.

Enter **no debug spanning-tree** to disable debugging.

## Examples

To enable debugging of spanning-tree for both Rx and Tx on Ethernet interface 0/1:

```
device# debug spanning-tree bpdu rx interface ethernet 0/1
```

```
device# debug spanning-tree bpdu tx interface ethernet 0/1
```

```
device# show debug spanning-tree
```

```
MSTP debugging status:  
Spanning-tree rx debugging is off  
Eth 0/1 rx is on  
Spanning-tree tx debugging is off  
Eth 0/1 tx is on
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# debug udd packet

Enables debugging for the Unidirectional Link Detection (UDLD) protocol.

## Syntax

```
debug udd packet [ all | { interface [ ethernet slot/port ] } { both | rx | tx }  
no debug udd packet
```

## Command Default

UDLD debugging is disabled.

## Parameters

- all**  
Activates UDLD debugging on all ports on the switch.
- ethernet**  
Represents a valid, physical Ethernet type for all available Ethernet speeds.
- slot/port*  
Specifies a valid slot and port number.
- both**  
Sets debugging for both received and transmitted packets.
- rx**  
Sets debugging for received packets only.
- tx**  
Sets debugging for transmitted packets only.

## Modes

Privileged EXEC mode

## Usage Guidelines

Diagnostic commands are developed and intended for specialized troubleshooting. Please work closely with Extreme Networks technical support in running **debug** or **show system internal** commands and interpreting their results.

When debugging is enabled UDLD PDUs are written to the console as they are transmitted and/or received on one or all ports.

Use the **show debug udd** command to view your current debug settings.

Use the **no** form of this command to turn off either all dumping of UDLD PDUs or dumping on a specific port.

debug udd packet

## Examples

To turn on debugging of transmitted packets on a specific ethernet interface:

```
device# debug udd packet interface ethernet 5/1 tx
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# default-information-originate (BGP)

Configures the device to originate and advertise a default BGP route.

## Syntax

**default-information-originate**

**no default-information-originate**

## Modes

BGP address-family IPv4 unicast configuration mode

BGP address-family IPv6 unicast configuration mode

BGP address-family IPv4 unicast VRF configuration mode

BGP address-family IPv6 unicast VRF configuration mode

## Usage Guidelines

The **no** form of the command restores the default.

## Examples

The following example originates and advertises a default BGP4 route.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv4 unicast
device(config-bgp-ipv4u)# default-information-originate
```

The following example originates and advertises a default BGP4+ route for VRF "red".

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv6 unicast vrf red
device(config-bgp-ipv6u-vrf)# default-information-originate
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# default-information-originate (IS-IS)

Generates a default route into an Intermediate System-to-Intermediate System (IS-IS) routing domain.

## Syntax

```
default-information-originate [ route-map name ]
no default-information-originate [ route-map name ]
```

## Command Default

Disabled.

## Parameters

**route-map** *name*  
Specifies that the default route is generated if the route map is satisfied. The route map name can be from 1 through 63 characters in length.

## Modes

IS-IS address-family IPv4 unicast configuration mode  
IS-IS address-family IPv6 unicast configuration mode

## Usage Guidelines

The **no** form of the command disables default route origination.

## Examples

The following example generates a default external route into an IS-IS domain.

```
device# configure terminal
device(config)# router isis
device(config-isis-router)# address-family ipv4 unicast
device(config-router-isis-ipv4u)# default-information-originate
```

The following example generates a default external route into an IS-IS domain if the route map "myroutemap" is satisfied

```
device# configure terminal
device(config)# router isis
device(config-isis-router)# address-family ipv6 unicast
device(config-router-isis-ipv6u)# default-information-originate route-map myroutemap
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# default-information-originate (OSPFv2)

Controls distribution of default information to an OSPFv2 device.

## Syntax

```
default-information-originate [ always ] [ metric metric ] [ metric-type { type1 | type2 } ] [ route-map name ]
no default-information-originate
```

## Command Default

The default route is not advertised into the OSPFv2 domain.

## Parameters

### always

Always advertises the default route. If the route table manager does not have a default route, the router advertises the route as pointing to itself.

### metric *metric*

specifies the cost for reaching the rest of the world through this route. If you omit this parameter and do not specify a value using the *default-metric* router configuration command, a default metric value of 1 is used. Valid values range from 1 through 65535. The default is 10.

### metric-type

Specifies how the cost of a neighbor metric is determined. The default is **type1**. However, this default can be changed with the **metric-type** command.

#### type1

Type 1 external route.

#### type2

Type 2 external route.

### route-map *name*

Specifies that the default route is generated if the route map is satisfied. This parameter overrides other options. If the **set metric** and **set metric-type** commands are specified in the route-map, the command-line values of metric and metric-type if specified, are "ignored" for clarification.

## Modes

OSPF router configuration mode

OSPF router VRF configuration mode

## Usage Guidelines

This configuration provides criteria for the redistribution of any default routes found in the route table manager (RTM), whether static or learned from another protocol, to its neighbors.

The corresponding route-map should be created before configuring the **route-map** option, along with the **default-information-originate** command. If the corresponding route-map is not created beforehand, an error message is displayed stating that the route-map must be created.

The route-map option cannot be used with a non-default address in the match conditions. The default route LSA is not generated if a default route is not present in the routing table and a **match ip address** condition for an existing non-default route is configured in the route-map. The **match ip address** command in the route-map is a no-op operation for the default information originate command.

The **no** form of the command disables default route origination.

## Examples

The following example creates and advertises a default route with a metric of 30 and a type 1 external route.

```
device# configure terminal
device(config)# router ospf
device(config-router-ospf-vrf-default-vrf)# default-information-originate metric 30 metric-type type1
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# default-information-originate (OSPFv3)

Controls distribution of default information to an OSPFv3 device.

## Syntax

```
default-information-originate [ always ] [ metric metric ] [ metric-type { type1 | type2 } ]
no default-information-originate
```

## Command Default

The default route is not advertised into the OSPFv3 domain.

## Parameters

### always

Always advertises the default route. If the route table manager (RTM) does not have a default route, the router advertises the route as pointing to itself.

### metric *metric*

Used for generating the default route, this parameter specifies the cost for reaching the rest of the world through this route. If you omit this parameter, the value of the **default-metric** command is used for the route. Valid values range from 1 through 65535.

### metric-type

Specifies the external link type associated with the default route advertised into the OSPF routing domain.

#### type1

The metric of a neighbor is the cost between itself and the router plus the cost of using this router for routing to the rest of the world.

The default is **type1**.

#### type2

The metric of a neighbor is the total cost from the redistributing routing to the rest of the world.

## Modes

OSPFv3 router configuration mode

OSPFv3 router VRF configuration mode

## Usage Guidelines

This configuration provides criteria for the redistribution of any default routes found in the RTM (whether static or learned from another protocol) to its neighbors.

The **no** form of the command disables default route origination.

## Examples

The following example specifies a metric of 20 for the default route redistributed into the OSPFv3 routing domain and an external metric type of Type 2.

```
device# configure terminal
device(config)# ipv6 router ospf
device(config-ipv6-router-ospf-vrf-default-vrf)# default-information-originate metric 20 metric-type
type2
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# default-link-metric

Configures the metric value globally on all active Intermediate System-to-Intermediate System (IS-IS) interfaces for a specified address family.

## Syntax

```
default-link-metric { level-1 | level-2 } value
```

```
no default-link-metric { level-1 | level-2 }
```

## Command Default

Disabled.

## Parameters

### level-1

Specifies the default-link-metric parameter as Level 1.

### level-2

Specifies the default-link-metric parameter as Level 2.

### value

Specifies the default-link-metric value in metric style. The narrow metric range is from 1 through 63. The wide metric range is from 1 through 16777215. The default is 10.

## Modes

IS-IS address-family IPv4 unicast configuration mode

IS-IS address-family IPv6 unicast configuration mode

## Usage Guidelines

This command is useful when you have a common IS-IS metric value on all IS-IS interfaces (other than the default metric value of 10). This command is not applicable to MPLS IS-IS shortcuts and tunnel interfaces.

If you change the metric style configuration, the value of the default link metric also changes. The new value of the default link metric is equal to the minimum of the configured value and the maximum value supported by the new metric style. For example, if the metric style changes from wide metric to narrow metric, and the default-link-metric value is greater than 63, the default-link-metric value changes to 63 because it is the maximum value supported in the narrow metric style. When the metric style changes from a narrow metric to a wide metric, there is no change to the default-link-metric value.

You can change the metric value for a specific interface using the **isis metric** command or the **isis ipv6 metric** command. The **isis metric** command configuration takes precedence over the **default-link metric value** command configuration.

The **no** form of the command resets the metric value to the default value 10.

## Examples

The following example configures the IS-IS default-link-metric value to 30 for Level 1 for the IPv4 unicast address family.

```
device# configure terminal
device(config)# router isis
device(config-isis-router)# address-family ipv4 unicast
device(config-router-isis-ipv4u)# default-link-metric level-1 30
```

The following example configures the IS-IS default-link-metric value to 30 for Level 1, and the IS-IS default-link-metric value to 40 for Level 2 for the IPv6 unicast address family.

```
device# configure terminal
device(config)# router isis
device(config-isis-router)# address-family-ipv6 unicast
device(config-router-isis-ipv6u)# default-link-metric level-1 30
device(config-router-isis-ipv6u)# default-link-metric level-2 40
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# default-local-preference

Enables setting of a local preference value to indicate a degree of preference for a route relative to that of other routes.

## Syntax

```
default-local-preference num
no default-local-preference
```

## Parameters

*num*

Local preference value. Range is from 0 through 65535. The default is 100.

## Modes

BGP configuration mode

## Usage Guidelines

Local preference indicates a degree of preference for a route relative to that of other routes. BGP4 neighbors can send the local preference value as an attribute of a route in an UPDATE message.

## Examples

The following example sets the local preference value to 200.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# default-local-preference 200
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# default-metric (BGP)

Changes the default metric used for redistribution.

## Syntax

**default-metric** *value*

**no default-metric**

## Command Default

The default metric value is 1.

## Parameters

*value*

Metric value. Range is from 0 through 4294967295.

## Modes

BGP address-family IPv4 unicast configuration mode

BGP address-family IPv6 unicast configuration mode

BGP address-family IPv4 unicast VRF configuration mode

BGP address-family IPv6 unicast VRF configuration mode

## Usage Guidelines

The **no** form of the command restores the default.

## Examples

The following example changes the default metric used for redistribution to 100.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv4 unicast
device(config-bgp-ipv4u)# default-metric 100
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# default-metric (IS-IS)

Sets the default redistribution metric value for the Intermediate System-to-Intermediate System (IS-IS) routing protocol.

## Syntax

**default-metric** *value*

**no default-metric**

## Command Default

The default metric value is 0.

## Parameters

*value*

Specifies the default metric value. Valid values range from 0 through 65535. The default is 0.

## Modes

IS-IS address-family IPv4 unicast configuration mode

IS-IS address-family IPv6 unicast configuration mode

## Usage Guidelines

The **no** form of the command resets the default metric value to the default value of 0.

## Examples

The following example sets the default metric value to 20 for the IPv4 unicast address family.

```
device# configure terminal
device(config)# router isis
device(config-isis-router)# address-family ipv4 unicast
device(config-router-isis-ipv4u)# default-metric 20
```

The following example sets the default metric value to 40 for the IPv6 unicast address family.

```
device# configure terminal
device(config)# router isis
device(config-isis-router)# address-family ipv6 unicast
device(config-router-isis-ipv6u)# default-metric 40
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# default-metric (OSPF)

Sets the default metric value for the OSPFv2 or OSPFv3 routing protocol.

## Syntax

**default-metric** *metric*

**no default-metric**

## Parameters

*metric*

OSPF routing protocol metric value. Valid values range from 1 through 65535. The default is 10.

## Modes

OSPF router configuration mode

OSPFv3 router configuration mode

OSPF router VRF configuration mode

OSPFv3 router VRF configuration mode

## Usage Guidelines

This command overwrites any incompatible metrics that may exist when OSPFv2 or OSPFv3 redistributes routes. Therefore, setting the default metric ensures that neighbors will use correct cost and router computation.

The **no** form of the command restores the default setting.

## Examples

The following example sets the default metric to 20 for OSPF.

```
device# configure terminal
device(config)# router ospf
device(config-router-ospf-vrf-default-vrf)# default-metric 20
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# default-passive-interface

Marks all OSPFv2 and OSPFv3 interfaces passive by default.

## Syntax

**default-passive-interface**

**no default-passive-interface**

## Modes

OSPF router configuration mode

OSPFv3 router configuration mode

OSPF router VRF configuration mode

OSPFv3 router VRF configuration mode

## Usage Guidelines

When you configure the interfaces as passive, the interfaces drop all the OSPFv2 and OSPFv3 control packets.

You can use the **ip ospf active** and **ip ospf passive** commands in interface subconfiguration mode to change active/passive state on specific OSPFv2 interfaces. You can use the **ipv6 ospf active** and **ipv6 ospf passive** commands in interface subconfiguration mode to change the active and passive state on specific OSPFv3 interfaces.

The **no** form of the command disables the passive state.

## Examples

The following example marks all OSPFv2 interfaces as passive.

```
device# configure terminal
device(config)# router ospf
device(config-router-ospf-vrf-default-vrf)# default-passive-interface
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# delay

For an implementation of an event-handler profile, specifies a delay from when a trigger is received until execution of the event-handler action.

## Syntax

**delay** *seconds*

**no delay**

## Command Default

There is no delay from when a trigger is received until execution of the event-handler action.

## Parameters

*seconds*

Specifies the number of seconds from when a trigger is received until the execution of the specified action begins. Valid values are 0 or a positive integer.

## Modes

Event-handler activation mode

## Usage Guidelines

The **no** form of this command resets the **delay** setting to the default 0 seconds.

## Examples

The following example specifies a delay of 60 seconds.

```
device# configure terminal
device(config)# event-handler activate eventHandler1
device(config-activate-eventHandler1)# delay 60
```

The following example resets **delay** to the default value of 0 seconds.

```
device# configure terminal
device(config)# event-handler activate eventHandler1
device(config-activate-eventHandler1)# no delay
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# delay-link-event

Configures the port transition hold timer to set a delay in the sending of port up or down port events, or both, to Layer 2 protocols.

## Syntax

```
delay-link-event multiple-iteration { down | up | both }
```

```
no delay-link-event
```

## Command Default

The sending of an up or down port event is not delayed.

## Parameters

*multiple-iteration*

Specifies the number of times that the polling iteration occurs. Enter an integer from 1 to 200. The polling iteration is 50 ms. The delay time is the *multiple-iteration* times 50 ms.

**both**

Sets the delay for the port down and up events.

**down**

Sets the delay for the port down event.

**up**

Sets the delay for the port up event.

## Modes

Interface Ethernet configuration mode.

## Usage Guidelines

Use the **no** form of the command to remove the delay from the port events on the interface.

While link down events are reported immediately in the Syslog, their effect on higher level protocols such as OSPF is delayed according to how the hold timer is configured. When configured, the timer affects the physical link events. However, the resulting logical link events are also delayed.

### NOTE

All LAG member ports must have the same delayed-link-event configuration.

### NOTE

The delayed-link-event configuration is applicable only on a physical interface. It is not valid on a VLAN, VE, LAG, or loopback interfaces.

**NOTE**

The port transition hold timer does not take effect when the interface is administratively shut down.

## Examples

The following example shows the steps in the previous configuration.

```
device# configure terminal
device(config)# interface Ethernet 4/2
device(conf-if-eth-4/2)# delay-link-event 2 down
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# delete

Deletes a user-generated file from the flash memory.

## Syntax

`delete file`

## Parameters

*file*

The name of the file to be deleted.

## Modes

Privileged EXEC mode

## Usage Guidelines

The delete operation is final; there is no mechanism to restore the file.

System configuration files cannot be deleted. If you try to delete a system configuration file, an appropriate message is displayed.

## Examples

To delete a user-generated copy of a configuration file:

```
device# delete myconfig

% Warning: File will be deleted (from flash:)!
Continue?(y/n): y
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# delete-packet

Configures the logging or monitoring interval for all Traffic Management (TM) deleted packets on the SLX-OS device.

## Syntax

```
delete-packet { logging-interval minutes } | { threshold deleted-packets }
no delete-packet logging-interval | threshold
```

## Command Default

The logging interval is 60 minutes.

The default threshold is zero (0) deleted packets.

## Parameters

**logging-interval** *minutes*

Specifies the logging interval in minutes. Enter an integer from from 10 to 2880.

**threshold** *deleted-packets*

Specifies the threshold limit for all deleted packets of the TM device. Enter a value from 0 to 10000. The value of 0 disables the monitoring of the all TM deleted packets.

## Modes

System monitor TM configuration mode

## Usage Guidelines

Use the **no** version of this command to reset the default interval or threshold values.

A RASlog message for the TM device statistics is generated within the logging interval similar to the following format:

```
M1 | Active, WARNING, SLX, TM threshold, Head deleted packets 34462
on device 3.1.1.
```

## Examples

The following example configures the logging interval to 120 minutes.

```
device# configure terminal
device(config)# system-monitor tm
device(config-sys-mon-tm)# delete-packet logging-interval 120
```

The following example configures the threshold to 50 deleted packets.

```
device# configure terminal
device(config)# system-monitor tm
device(config-sys-mon-tm)# delete-packet threshold 50
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# deploy

Deploys the MCT cluster, cluster client, or cluster pseudowire (PW) client.

## Syntax

**deploy**  
**no deploy**

## Modes

Cluster configuration mode  
 Cluster client configuration mode  
 Cluster client PW configuration mode

## Usage Guidelines

Before deploying a cluster, the cluster client must be configured.

Before deploying a cluster client, the client interface and ESI settings must be configured under the client configuration.

Before deploying a cluster PW client, the ESI value must be configured under the PW client configuration.

An LSP is automatically created when you deploy a cluster. When you undeploy a cluster, the LSP is removed.

The client will not operate in MCT mode unless the remote client is also deployed.

The **no** form of the command undeploys the cluster, cluster client, or PW cluster client.

When the client is undeployed, all MAC addresses are removed locally and a withdraw message is sent to the MCT peer to remove all associated client MAC addresses.

## Examples

The following example shows the deployment of a cluster.

```
device(config)# cluster MCT1 1
device(config-cluster-1)# deploy
```

The following example shows the deployment of a cluster client.

```
device(config)# cluster MCT1 1
device(config-cluster-1)# client MCT1-client 200
device(config-cluster-client-200)# deploy
```

The following example shows the deployment of a PW cluster client.

```
device(config)# cluster MCT1 1
device(config-cluster-1)# client-pw
device(config-cluster-client-pw)# deploy
```



## History

Release version	Command history
16r.1.01	This command was introduced.
17r.1.01	This command under cluster client PW configuration mode was introduced.

# description (BD)

Specify a string that contains the description for a bridge-domain or multiple bridge-domains.

## Syntax

**description** [ *description-string* ]

**no description** [ *description-string* ]

## Parameters

*description-string*

Specifies the description in a string format. The space character between the **description** keyword and the *description-string* is allowed.

## Modes

Global bridge-domain configuration mode.

## Usage Guidelines

The **no description** of the command removes the description specified for a bridge-domain.

The **show bridge-domain** command displays an extra field in the output displaying the description of the bridge-domain. For example, **description vpls bridge-domain** is displayed.

## Examples

The following example shows how to specify a description for bridge-domain 10.

```
device# configure terminal
device(config)# bridge-domain 10
device(config-bridge-domain-10)# description vpls bridge domain
```

## History

Release version	Command history
17r.1.01a	This command was introduced.

# description (event-handler)

Defines a description for an event-handler profile.

## Syntax

**description** *description-text*

**no description**

## Command Default

No description is defined.

## Parameters

*description-text*

Characters describing the event-handler profile. The string can be 1 through 128 ASCII characters in length. Do not use the ? character. If you need to use ! or \, precede each with \.

## Modes

Event-handler configuration mode

## Usage Guidelines

An event-handler profile supports only one description.

To delete a description, use the **no** form of this command.

To change a description, you do not need to first delete the existing description. Just create a new description.

## Examples

The following example defines a description for eventHandler1.

```
device# configure terminal
device(config)# event-handler eventHandler1
device(config-event-handler-eventHandler1)# description This is a sample description.
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# description (interfaces)

Specify a string that contains the description of a specified interface.

## Syntax

**description** *line*

## Parameters

*line*

Specifies characters describing the interface. The string must be between 1 and 63 ASCII characters in length.

## Modes

Interface subtype configuration mode

## Examples

To set the string describing internal Ethernet interface 3/2:

```
device# configure terminal
device(config)# interface ethernet 3/2
device(conf-if-eth-3/2)# description converged_101
```

# description (LLDP)

Specifies a string that contains the LLDP description.

## Syntax

**description** *string*

**no description**

## Parameters

*string*

Characters describing LLDP. The string must be between 1 and 50 ASCII characters in length.

## Modes

Protocol LLDP and profile configuration modes

## Usage Guidelines

Enter **no description** to remove the LLDP description.

The LLDP description can also be configured for a specific LLDP profile. When you apply an LLDP profile on an interface using the **lldp profile** command, it overrides the global configuration. If a profile is not present, then the default global profile is used until you create a valid profile.

## Examples

To set the strings describing LLDP:

```
device(config-lldp)# description Extreme-LLDP
```

To set the strings describing LLDP for a specific LLDP profile, test2, enter the following:

```
device(config-lldp)# profile test1
device(config-profile-test1)# description test2
device(config-profile-test1)#
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# description (STP)

Describes an xSTP configuration.

## Syntax

**description** *description*

**no description**

## Parameters

*description*

Characters describing the xSTP configuration. The string must be between 1 and 64 ASCII characters in length.

## Modes

xSTP configuration mode

## Usage Guidelines

Enter **no description** to remove the description.

## Examples

To specify the bridge priority:

```
device# configure terminal
device(config)# protocol spanning-tree stp
device(conf-stp)# description STP-S1
```

```
device# configure terminal
device(config)# protocol spanning-tree rstp
device(conf-rstp)# description RSTP-S1
```

```
device# configure terminal
device(config)# protocol spanning-tree mstp
device(conf-mstp)# description MSTP-S1
```

## History

Release version	Command history
16r.1.00	This command was introduced.

## description (VRRP)

Describes a Virtual Router Redundancy Protocol extended (VRRP-E) interface.

### Syntax

**description** *description*

**no description**

### Parameters

*description*

Characters describing the VRRP-E interface. The string must be between 1 and 64 ASCII characters in length.

### Modes

Virtual-router-group configuration mode

### Usage Guidelines

Enter **no description** to remove the description.

### Examples

To describe the VRRP-E group 10 interface:

```
device# configure terminal
device(config)# interface ve 25
device(config-ve-25)# vrrp-extended-group 10
device(config-vrrp-extended-group-10)# description vrrpe_group_10
```

### History

Release version	Command history
16r.1.00	This command was introduced.

# designated-forwarder-hold-time

Configures the time in seconds to wait before electing a designated forwarder.

## Syntax

`designated-forwarder-hold-time seconds`

`designated-forwarder-hold-time`

## Command Default

The default setting is three seconds.

## Parameters

*seconds*

Specifies the hold time in seconds. Enter an integer from 1 to 60.

## Modes

Cluster configuration mode

## Usage Guidelines

Use the **no** form of the command to reset the default setting of three seconds.

The designated forwarder is a PE in a set of multi-homing PEs connected to the same Ethernet segment that is responsible for sending BUM traffic to a client for a particular VLAN ID on an Ethernet segment.

DF election is not triggered unless at least one remote CCEP is configured. When a CCEP goes up or down, DF election is triggered as soon as the Ethernet route acknowledgment from remote peer is received.

When a client is deployed locally or remotely, or the BGP session comes up, the DF timer does not start and DF election is not performed until the timer expired.

## Examples

The following example configures a 20-second hold time for DF election.

```
device(config)# cluster MCT1 1
device(config-cluster-1)# designated-forwarder-hold-time 20
```

## History

Release version	Command history
16r.1.01	This command was introduced.



# destination

Configures the destination address for the tunnel interface.

## Syntax

**destination** *ip-address*

**no destination** *ip-address*

## Command Default

No tunnel interface destination is configured.

## Parameters

*ip-address*

Specifies the IPv4 address.

## Modes

Interface tunnel configuration mode

## Usage Guidelines

Use the **no tunnel destination** command to remove the destination configuration.

You must ensure that a route to the tunnel destination exists on the tunnel source device and create a static route if necessary.

## Examples

This example configures the IP address 10.1.2.3 as the destination address.

```
device# configure terminal
device(config)# interface tunnel 5
device(config-intf-tunnel-5)# destination 10.1.2.3
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# dhcp ztp cancel

The Zero Touch Provisioning (ZTP) session indefinitely retries detecting the DHCP server to establish a network connection for firmware download. Once canceled, the ZTP session stops retrying.

## Syntax

```
dhcp ztp cancel
```

## Modes

Privileged EXEC mode

## Usage Guidelines

Once canceled, the ZTP session stops retry, irrespective of whether the process succeeds or fails. If firmware download completes successfully, the device returns to the normal mode. The following limitations apply:

- If firmware download has not started, you will need to reboot the switch manually to bring the switch back to normal mode.
- If firmware download has already started, you must wait for firmware download to complete before running any other CLI, power cycling the switch, starting a new firmware download, or starting a new ZTP session.
- If firmware download completes and the switch fails to reboot, you must reboot the switch manually to bring the switch back to normal mode.

## Examples

The following example cancels the ZTP retry.

```
device# dhcp ztp cancel
Warning: This command will terminate the existing ZTP session
Do you want to continue? [y/n] y
```

You can confirm that ZTP is canceled by running the **dhcp ztp cancel** command again. The output confirms that ZTP is disabled.

```
device# dhcp ztp cancel
ZTP is not enabled.
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# dhcp ztp log

Displays the Zero Touch Provisioning progress log.

## Syntax

```
dhcp ztp log
```

## Modes

Privileged EXEC mode

## Usage Guidelines

The progress log displays if Zero Touch Provisioning is enabled.

## Examples

The following example shows the ZTP progress log.

```
device# dhcp ztp log
ZTP, Wed Jun 29 17:32:36 2016, ===== ZTP start =====
ZTP, Wed Jun 29 17:32:36 2016, disable raslog
ZTP, Wed Jun 29 17:32:36 2016, CLI is ready
ZTP, Wed Jun 29 17:33:11 2016, inband ports are enabled
ZTP, Wed Jun 29 17:33:11 2016, serial number = EXH3343L014
ZTP, Wed Jun 29 17:33:11 2016, model name = SLX9140
ZTP, Wed Jun 29 17:33:11 2016, use inband interfaces only
ZTP, Wed Jun 29 17:33:13 2016, get link down on all the interfaces
ZTP, Wed Jun 29 17:33:13 2016, retry in 10 seconds
ZTP, Wed Jun 29 17:33:23 2016, inband ports are enabled
ZTP, Wed Jun 29 17:33:24 2016, serial number = EXH3343L014
ZTP, Wed Jun 29 17:33:24 2016, model name = SLX9140
ZTP, Wed Jun 29 17:33:24 2016, use inband interfaces only
ZTP, Wed Jun 29 17:33:24 2016, get link down on all the interfaces
ZTP, Wed Jun 29 17:33:24 2016, retry in 10 seconds
ZTP, Wed Jun 29 17:33:34 2016, inband ports are enabled
ZTP, Wed Jun 29 17:33:34 2016, serial number = EXH3343L014
ZTP, Wed Jun 29 17:33:34 2016, model name = SLX9140
ZTP, Wed Jun 29 17:33:34 2016, use inband interfaces only
ZTP, Wed Jun 29 17:33:35 2016, checking inband interfaces link status
ZTP, Wed Jun 29 17:34:25 2016, find link up on interfaces: Eth0.6 Eth0.8
ZTP, Wed Jun 29 17:34:25 2016, start dhcp process on interfaces: Eth0.6 Eth0.8
ZTP, Wed Jun 29 17:34:34 2016, interface Eth0.8 receives dhcp response
ZTP, Wed Jun 29 17:34:34 2016, config ip address 192.169.0.147/24 on interface Eth0.8
ZTP, Wed Jun 29 17:34:39 2016, ping ftp server 192.169.0.2
ZTP, Wed Jun 29 17:34:40 2016, ping succeed
ZTP, Wed Jun 29 17:34:41 2016, download ZTP config file from ftp://192.169.0.2/config/ztp.cfg
ZTP, Wed Jun 29 17:34:41 2016, receive ZTP configuration file [ztp.cfg]
ZTP, Wed Jun 29 17:34:41 2016, interface Eth0.8 connectivity test pass
ZTP, Wed Jun 29 17:34:41 2016, download script file [ztp.py]
ZTP, Wed Jun 29 17:34:41 2016, ZTP configuration sanity check pass
ZTP, Wed Jun 29 17:38:22 2016, ===== ZTP continue =====
ZTP, Wed Jun 29 17:38:22 2016, disable raslog
ZTP, Wed Jun 29 17:38:22 2016, CLI is ready
ZTP, Wed Jun 29 17:38:58 2016, running configuration script [ztp.py]
ZTP, Wed Jun 29 17:39:25 2016, commit configuration
ZTP, Wed Jun 29 17:39:25 2016, ZTP succeed
ZTP, Wed Jun 29 17:39:25 2016, enable raslog
ZTP, Wed Jun 29 17:39:25 2016, ===== ZTP completed =====
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# dir

Lists the contents of the device flash memory.

## Syntax

dir

## Modes

Privileged EXEC mode

## Examples

The following example lists the contents of the flash memory.

```
device# dir
total 572
drwxr-xr-x 2 251 1011 4096 Jun 5 07:08 .
drwxr-xr-x 3 251 1011 4096 Mar 11 00:00 ..
-rw-r--r-- 1 root sys 410 Jun 3 00:56 defaultconfig.standalone
-rw-r--r-- 1 root sys 695 Jun 3 00:56 defaultconfig.cluster
-rw-r--r-- 1 root root 185650 Jun 5 09:38 startup-config
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# disable

Use the **disable** command to disable the dynamic bypass in MPLS router or on a MPLS Ethernet interface without deleting the configurations of dynamic bypass configuration block.

## Syntax

```
disable
no disable
```

## Command Default

The default configuration is **no disable**.

## Modes

MPLS router dynamic bypass configuration mode (config-router-mpls-dynamic-bypass).

MPLS router MPLS interface dynamic bypass configuration mode (config-router-mpls-if-ethernet-slot/port-dynamic-bypass).

## Usage Guidelines

The command brings down and deletes all the existing dynamic bypasses in the system.

The **no** form of the command enables dynamic bypass in MPLS router.

The **no** form of the command enables the dynamic bypass configuration on the MPLS interface.

## Examples

The following example disables the dynamic bypass in the MPLS router.

```
device>configure
device(config)# router mpls
device(config-router-mpls)# dynamic-bypass
device(config-router-mpls-dynamic-bypass)# disable
```

The following example disables dynamic bypass on MPLS Ethernet interface 2/8 .

```
device>configure
device(config)# router mpls
device(config-router-mpls)# mpls-interface ethernet 2/8
device(config-router-mpls-if ethernet-2/8)# dynamic bypass
device(config-router-mpls-if-ethernet-2/8-dynamic-bypass)# disable
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# disable-adjacency-check

Disables Intermediate System-to-Intermediate System (IS-IS) IPv6 protocol-support consistency checks that are performed prior to forming adjacencies on hello packets.

## Syntax

```
disable-adjacency-check
no disable-adjacency-check
```

## Command Default

Disabled.

## Modes

IS-IS address-family IPv6 unicast configuration mode

## Usage Guidelines

The **no** form of the command re-enables the IS-IS IPv6 protocol-support consistency checks.

## Examples

The following example disables the IS-IS IPv6 protocol-support consistency checks.

```
device# configure terminal
device(config)# router isis
device(config-isis-router)# address-family ipv6 unicast
device(config-router-isis-ipv6u)# disable-adjacency-check
```

The following example re-enables the IS-IS IPv6 protocol-support consistency checks.

```
device# configure terminal
device(config)# router isis
device(config-isis-router)# address-family ipv6 unicast
device(config-router-isis-ipv6u)# no disable-adjacency-check
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# disable-incremental-spf-opt

Disables incremental full SPF optimizations for Intermediate System-to-Intermediate System (IS-IS).

## Syntax

```
disable-incremental-spf-opt
```

```
no disable-incremental-spf-opt
```

## Command Default

Disabled.

## Modes

IS-IS router configuration mode

## Usage Guidelines

If you disable the partial SPF optimizations using the **disable-partial-spf-opt** command, IS-IS automatically disables the incremental SPF optimizations and always runs full SPF. However, if you disable incremental SPF optimizations using this command, IS-IS does not disable partial optimizations.

The **no** form of the command restores incremental SPF optimizations for IS-IS.

## Examples

The following example disables incremental SPF optimizations for IS-IS.

```
device# configure terminal
device(config)# router isis
device(config-isis-router)# disable-incremental-spf-opt
```

The following example restores incremental SPF optimizations for IS-IS.

```
device# configure terminal
device(config)# router isis
device(config-isis-router)# no disable-incremental-spf-opt
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# disable-inc-stct-spf-opt

Disables incremental shortcut LSP SPF optimization.

## Syntax

```
disable-inc-stct-spf-opt
```

```
disable-inc-stct-spf-opt
```

## Command Default

Disabled.

## Modes

IS-IS router configuration mode

## Usage Guidelines

The **no** form of the command restores incremental shortcut LSP SPF optimization.

## Examples

The following example disables incremental shortcut LSP SPF optimization.

```
device# configure terminal
device(config)# router isis
device(config-isis-router)# disable-inc-stct-spf-opt
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# disable-partial-spf-opt

Disables partial SPF optimizations for Intermediate System-to-Intermediate System (IS-IS).

## Syntax

```
disable-partial-spf-opt
no disable-partial-spf-opt
```

## Command Default

Disabled.

## Modes

IS-IS router configuration mode

## Usage Guidelines

If you disable the partial SPF optimizations using this command, IS-IS automatically disables the incremental SPF optimizations and always runs full SPF. However, if you disable incremental SPF optimizations using the **disable-incremental-spf-opt** command, IS-IS does not disable partial optimizations.

The **no** form of the command restores partial SPF optimizations for IS-IS.

## Examples

The following example disables partial SPF optimizations for IS-IS.

```
device# configure terminal
device(config)# router isis
device(config-isis-router)# disable-partial-spf-opt
```

The following example restores partial SPF optimizations for IS-IS.

```
device# configure terminal
device(config)# router isis
device(config-isis-router)# no disable-partial-spf-opt
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# discard-packet

Configures the logging or monitoring interval for all Traffic Management (TM) discarded packets on the SLX-OS device.

## Syntax

```
discard-packet { logging-interval minutes } | { threshold discarded-packets }
no discard-packet logging-interval | threshold
```

## Command Default

The logging interval is 60 minutes.

The default threshold is zero (0) discarded packets.

## Parameters

**logging-interval** *minutes*

Specifies the logging interval in minutes. Enter an integer from from 10 to 2880.

**threshold** *discarded-packets*

Specifies the threshold limit for all discarded packets of the TM device. Enter a value from 0 to 10000. The value of 0 disables the monitoring of the all TM device packets.

## Modes

System monitor TM configuration mode

## Usage Guidelines

Use the **no** version of this command to reset the default interval or threshold values.

A RASlog message for the TM device statistics is generated within the logging interval. The message consists of the time stamp, the number of discarded packets, and ingress slot, tower and core, similar to the following example:

```
device# show logging raslog reverse count 10
2017/01/05-10:56:58, [SYSD-1005], 788, M2 | Active | DCE, WARNING, SLX, TM threshold, Tail discarded
packets 20734462 on device 3.1.1.
```

## Examples

The following example configures the logging interval to 120 minutes.

```
device# configure terminal
device(config)# system-monitor tm
device(config-sys-mon-tm)# discard-packet logging-interval 120
```

The following example configures the threshold to 50 discarded packets.

```
device# configure terminal
device(config)# system-monitor tm
device(config-sys-mon-tm)# discard-packet threshold 50
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# discard-voq-packet

Configures the logging interval or threshold for all Virtual Output Queue (VOQ) discarded packets.

## Syntax

```
discard-voq-packet { logging-interval minutes } | { threshold discarded-packets }
no discard-voq-packet logging-interval | threshold
```

## Command Default

The logging interval is 60 minutes.

The default threshold is zero (0) discarded packets.

## Parameters

**logging-interval** *minutes*

Specifies the logging interval in minutes. Enter an integer from from 10 to 2880.

**threshold** *discarded-packets*

Specifies the threshold limit for all VOQ discarded packets. Enter a value from 0 to 10000. The value of 0 disables the monitoring of the all VOQ packets.

## Modes

System monitor TM configuration mode

## Usage Guidelines

Use the **no** version of this command to reset the default interval or threshold values.

A RASlog message for the TM VOQ statistics is generated within the logging interval. The message consists of the time stamp, destination slot and port, priority, and ingress slot, tower and core, similar to the following example.

```
device# show logging raslog reverse count 100 | inc SYSD-1003
2017/01/05-11:03:59, [SYSD-1003], 793, M2 | Active | DCE, WARNING, SLX, TM threshold
2017/01/05-11:00:34, Discarded packets 930587727, interface 3/2 prio 0 on device 3.1.0
```

The slot and port in the message determines the destination port that is congested at the ingress slot, tower, and core.

## Examples

The following example configures the logging interval to 120 minutes.

```
device# configure terminal
device(config)# system-monitor tm
device(config-sys-mon-tm)# discard-voq-packet logging-interval 120
```

The following example configures the threshold to 50 discarded packets.

```
device# configure terminal
device(config)# system-monitor tm
device(config-sys-mon-tm)# discard-voq-packet threshold 50
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# distance (BGP)

Changes the default administrative distances for eBGP, iBGP, and local BGP.

## Syntax

**distance** *external-distance internal-distance local-distance*

**no distance**

## Parameters

*external-distance*

eBGP distance. Range is from 1 through 255.

*internal-distance*

iBGP distance. Range is from 1 through 255.

*local-distance*

Local BGP4 and BGP4+ distance. Range is from 1 through 255.

## Modes

BGP configuration mode

## Usage Guidelines

To select one route over another according to the source of the route information, the device can use the administrative distances assigned to the sources. The administrative distance is a protocol-independent metric that IP devices use to compare routes from different sources. Lower administrative distances are preferred over higher ones.

## Examples

The following example configures the device to change the administrative distance.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# distance 100 150 200
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# distance (IS-IS)

Configures an administrative distance value for Intermediate System-to-Intermediate System (IS-IS) routes.

## Syntax

**distance** *number*

**no distance** *number*

## Command Default

The default is 115.

## Parameters

*value*

Specifies the administrative distance. Valid values range from 1 through 255. The default is 115.

## Modes

IS-IS address-family IPv4 unicast configuration mode

IS-IS address-family IPv6 unicast configuration mode

## Usage Guidelines

Routes with a distance value of 255 are not installed in the routing table.

The **no** form of the command resets the distance value to the default value of 115.

## Examples

The following example sets an administrative distance of 40 for the IPv4 unicast address family.

```
device# configure terminal
device(config)# router isis
device(config-isis-router)# address-family ipv4 unicast
device(config-router-isis-ipv4u)# distance 40
```

The following example sets an administrative distance of 60 for the IPv6 unicast address family.

```
device# configure terminal
device(config)# router isis
device(config-isis-router)# address-family ipv6 unicast
device(config-router-isis-ipv6u)# distance 60
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# distance (OSPF)

Configures an administrative distance value for OSPFv2 and OSPFv3 routes.

## Syntax

```
distance { external | inter-area | intra-area } distance  
no distance
```

## Command Default

The administrative distance value for OSPFv2 and OSPFv3 routes is 110.

## Parameters

### external

Sets the distance for routes learned by redistribution from other routing domains.

### inter-area

Sets the distance for all routes from one area to another area.

### intra-area

Sets the distance for all routes within an area.

### *distance*

Administrative distance value assigned to OSPF routes. Valid values range from 1 through 255. The default is 110.

## Modes

OSPF router configuration mode

OSPFv3 router configuration mode

OSPF router VRF configuration mode

OSPFv3 router VRF configuration mode

## Usage Guidelines

You can configure a unique administrative distance for each type of OSPF route.

The distances you specify influence the choice of routes when the device has multiple routes from different protocols for the same network. The device prefers the route with the lower administrative distance. However, an OSPFv2 or OSPFv3 intra-area route is always preferred over an OSPFv2 or OSPFv3 inter-area route, even if the intra-area route's distance is greater than the inter-area route's distance.

The **no** form of the commands reverts to the default setting.

## Examples

The following example sets the distance value for all external routes to 125.

```
device# configure terminal
device(config)# router ospf
device(config-router-ospf-vrf-default-vrf)# distance external 125
```

The following example sets the distance value for intra-area routes to 80.

```
device# configure terminal
device(config)# router ospf
device(config-router-ospf-vrf-default-vrf)# distance intra-area 80
```

The following example sets the distance value for inter-area routes to 90.

```
device# configure terminal
device(config)# ipv6 router ospf
device(config-ipv6-router-ospf-vrf-default-vrf)# distance inter-area 90
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# distribute-list prefix-list (OSPFv3)

Applies a prefix list to OSPF for IPv6 routing updates. Only routes permitted by the prefix-list can go into the routing table.

## Syntax

```
distribute-list prefix-list list-name in
no distribute-list prefix-list
```

## Command Default

Prefix lists are not applied to OSPFv3 for IPv6 routing updates.

## Parameters

*list-name*

Name of a prefix-list. The list defines which OSPFv3 networks are to be accepted in incoming routing updates.

**in**

Applies the prefix list to incoming routing updates on the specified interface.

## Modes

OSPFv3 router configuration mode

OSPFv3 VRF router configuration mode

## Usage Guidelines

The **no** form of the command removes the prefix list.

## Examples

The following example configures a distribution list that applies the filterOspfRoutes prefix list globally:

```
device# configure terminal
device(config)# ipv6 router ospf
device(config-ipv6-router-ospf-vrf-default-vrf)# distribute-list prefix-list filterOspfRoutes in
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# distribute-list route-map

Creates a route-map distribution list.

## Syntax

```
distribute-list route-map map in
no distribute-list route-map
```

## Parameters

*map*  
Specifies a route map.

**in**  
Creates a distribution list for an inbound route map.

## Modes

OSPF router configuration mode  
 OSPFv3 router configuration mode  
 OSPF router VRF configuration mode  
 OSPFv3 router VRF configuration mode

## Usage Guidelines

The distribution list can filter Link State Advertisements (LSAs) received from other OSPF devices before adding the corresponding routes to the routing table.

The **no** form of the command removes the distribution list.

## Examples

The following example creates a distribution list using a route map named filter1 that has already been configured.

```
device# configure terminal
device(config)# router ospf
device(config-router-ospf-vrf-default-vrf)# distribute-list route-map filter1 in
```

## History

Release version	Command history
16r.1.00	This command was introduced.

## domain-name

Creates a maintenance domain at a specified level and name and enters the maintenance domain mode specified in the command argument.

### Syntax

**domain-name** *name level level*

**no domain-name** *name level level*

### Command Default

There is no domain configured.

### Parameters

*name*

Specifies the domain name.

**level** *level*

Sets the domain level.

### Modes

CFM protocol configuration mode

### Usage Guidelines

The *name* parameter is case sensitive. The level parameter sets the domain level in the range 0 - 7. When the domain already exists, the level argument is optional. Typically, the levels are:

- Customer's Domain Levels: 5 - 7
- Provider Domain Levels: 3 - 4
- Operator Domain Levels: 0 - 2

The **no** form of the command removes the specified domain from the CFM protocol configuration mode.

### Examples

```
device# configure terminal
device(config)# protocol cfm
device(config-cfm)# domain-name md1 level 4
device(config-cfm-md-md1)#
```

### History

Release version	Command history
16r.1.01	This command was introduced.

# dot1x authentication

Enables 802.1x authentication on a port.

## Syntax

`dot1x authentication`

`no dot1x authentication`

## Command Default

802.1x authentication is disabled for ports.

## Modes

Interface configuration mode

## Usage Guidelines

Port control must be configured to activate authentication on an 802.1x-enabled interface using the **dot1x port-control auto** command from interface configuration mode.

Before activating the authentication using the **dot1x port-control auto** command on a port, you must remove configured static ACLs and static VLANs, if any, from the port.

Enter the **no dot1x authentication** command to disable dot1x on the port and remove the configuration from 802.1x management.

## Examples

The following example enables 802.1x authentication on a specific port:

```
device(config)# interface Ethernet 1/1
device(conf-if-eth-1/1)# dot1x authentication
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# dot1x enable

Enables 802.1X authentication globally.

## Syntax

```
dot1x enable
```

## Command Default

802.1x authentication is not enabled.

## Modes

Global configuration mode

## Usage Guidelines

The **dot1x enable** command enables 802.1x authentication globally on all ports.

### NOTE

802.1x port authentication is not supported by LAG (Link Aggregation Group) or interfaces that participate in a LAG.

## Examples

The following example enables 802.1X authentication globally on all interfaces.

```
device(config)# dot1x enable
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# dot1x reauthenticate

Initiates 802.1X reauthentication on a specified interface.

## Syntax

```
dot1x reauthenticate interface ethernet slot/port
```

## Parameters

**interface ethernet** *slot/port*

Specifies a physical interface ethernet port in terms of slot number and port number.

## Modes

Privileged EXEC mode

## Examples

The following example initiates reauthentication of a client connected to physical interface 1/1:

```
device# dot1x reauthenticate interface ethernet 1/1
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# dot1x filter-strict-security

Enables or disables strict filter security for dot1x authentication on the interface.

## Syntax

`dot1x filter-strict-security`

`no dot1x filter-strict-security`

## Command Default

Strict filter security is enabled.

## Modes

Interface configuration mode

## Usage Guidelines

By default, strict security mode is enabled; that is the client is not authenticated if the Filter-Id attribute returned by RADIUS contains invalid information, or if insufficient system resources are available to implement the IP ACLs or MAC address filters.

When strict security mode is enabled:

- If the Filter-Id attribute in the Access-Accept message contains a value that does not refer to an existing filter (that is, a MAC address filter or IP ACL configured on the device), then the client will not be authenticated, regardless of any other information in the message (for example, if the Tunnel-Private-Group-ID attribute specifies a VLAN on which to assign the port).
- If the Vendor-Specific attribute specifies the syntax for a filter, but there are insufficient system resources to implement the filter, then the client will not be authenticated.
- If the device does not have the system resources available to dynamically apply a filter to a port, then the client will not be authenticated.

When strict security mode is disabled:

- If the Filter-Id attribute in the Access-Accept message contains a value that does not refer to an existing filter (that is, a MAC address filter or IP ACL configured on the device), then the client is still authenticated, but no filter is dynamically applied to it.
- If the Vendor-Specific attribute specifies the syntax for a filter, but there are insufficient system resources to implement the filter, then the client is still authenticated, but the filter specified in the Vendor-Specific attribute is not applied to the port.

The **no** form of the command disables strict filter security.

## Examples

The following example enables strict filter security.

```
device(config)# interface Ethernet 1/1
device(conf-if-eth-1/1)# dot1x filter-strict-security
```

## History

Release version	Command history
16r.1.00	This command was introduced.

## dot1x max-req

Configures the retransmission parameter that defines the maximum number of times EAP request/challenge frames are retransmitted when EAP response/identity frame is not received from the client.

### Syntax

```
dot1x max-req count
```

```
no dot1x max-req count
```

### Command Default

The device retransmits the EAP-request/challenge twice.

### Parameters

*count*

Specifies the number of EAP frame re-transmissions. The range is from 1 through 10. The default value is 2.

### Modes

Interface configuration mode

### Usage Guidelines

The **no** form of the command disables this functionality.

### Examples

The following example configures the device to retransmit an EAP-request/challenge frame to a client a maximum of three times.

```
device(config)# interface Ethernet 1/1
device(conf-if-eth-1/1)# dot1x max-req 3
```

### History

Release version	Command history
16r.1.00	This command was introduced.

# dot1x port-control

Controls port-state authorization and configures the port control type to activate authentication on an 802.1X-enabled interface.

## Syntax

```
dot1x port-control { auto | force-authorized | force-unauthorized }
```

```
no dot1x port-control { auto | force-authorized | force-unauthorized }
```

## Command Default

The default port state is **auto**.

## Parameters

### auto

Enables authentication on a port. It places the controlled port in the unauthorized state until authentication takes place between the client and authentication server. Once the client passes authentication, the port becomes authorized. This activates authentication on an 802.1X-enabled interface. The controlled port remains in the authorized state until the Client logs off.

### force-authorized

Places the controlled port unconditionally in the authorized state, allowing all traffic to pass between the client and the authenticator. This also allows connection from multiple clients.

### force-unauthorized

Places the controlled port unconditionally in the unauthorized state, denying any traffic to pass between the client and the authenticator.

## Modes

Interface subtype configuration mode

## Usage Guidelines

Before activating the authentication using the **dot1x port-control auto** command on a port, you must remove the configured static ACL and static VLANs, if any, from the port.

802.1x port authentication is not supported by LAG (Link Aggregation Group) or interfaces that participate in a LAG.

The **no** form of the command resets the port control type to the default state.

## Examples

The following example configures the interface to place the port unconditionally in the unauthorized state until authentication takes place between the client and authentication server. Once the client passes authentication, the port becomes authorized.

```
device(config)# interface Ethernet 1/1
device(conf-if-eth-1/1)# dot1x port-control auto
```

The following example configures the interface to place the controlled port unconditionally in the authorized state.

```
device(config)# interface Ethernet 1/1
device(conf-if-eth-1/1)# dot1x port-control force-authorized
```

The following example configures the interface to place the controlled port unconditionally in the unauthorized state.

```
device(config)# interface Ethernet 1/1
device(conf-if-eth-1/1)# dot1x port-control force-unauthorized
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# dot1x reauthentication

Configures the device to periodically reauthenticate the clients connected to 802.1X-enabled interfaces at regular intervals.

## Syntax

**dot1x reauthentication**

**no dot1x reauthentication**

## Command Default

Periodic reauthentication is disabled.

## Modes

Interface configuration mode

## Usage Guidelines

When periodic reauthentication is enabled using the **dot1x reauthentication** command, the device reauthenticates the clients every 3,600 seconds by default.

The reauthentication interval is configurable using the **dot1x timeout re-authperiod** command. The reauthentication interval configured using the **dot1x timeout re-authperiod** command takes precedence.

The **no dot1x reauthentication** command disables periodic reauthentication.

## Examples

The following example enables 802.1x reauthentication.

```
device# configure terminal
device(config)# interface Ethernet 1/1
device(conf-if-eth-1/1)# dot1x reauthentication
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# dot1x reauthMax

Sets the maximum number of times that a port attempts 802.1x reauthentication before the port changes to the unauthorized state.

## Syntax

`dot1x reauthMax number`

`no dot1x reauthMax`

## Command Default

The number of times that a port attempts 802.1x authentication is 2.

## Parameters

*number*

Specifies the maximum number of reauthentication attempts before the port goes to the unauthorized state. Valid values range from 1 through 10.

## Modes

Interface configuration mode

## Usage Guidelines

The `no dot1x reauthMax` command restores the default setting.

## Examples

The following example sets the maximum number of reauthentication attempts to 5.

```
device# configure terminal
device(config)# interface Ethernet 1/1
device(config-if-eth-1/1)# dot1x reauthMax 5
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# dot1x quiet-period

Configures the time interval that the device remains idle between a failed authentication and a reauthentication attempt.

## Syntax

`dot1x quiet-period seconds`

`no dot1x quiet-period`

## Command Default

The default quiet period is 60 seconds.

## Parameters

*seconds*

Specifies the time between failed reauthentication and reauthentication attempt. Valid values range from 1 through 65535 seconds.

## Modes

Interface configuration mode

## Usage Guidelines

Changing the quiet-period interval time to a number lower than the default can result in a faster response time.

The `no dot1x quiet-period` command restores the default setting.

## Examples

The following example sets the idle time as 200 seconds for the device before attempting reauthentication after an authentication failure.

```
device(config)# interface Ethernet 1/1
device(conf-if-eth-1/1)# dot1x quiet-period 200
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# dot1x test eapol-capable

Executes the 802.1x readiness check on the switch.

## Syntax

```
dot1x test eapol-capable interface ethernet slot/port
```

## Parameters

**interface ethernet** *slot/port*

Specifies a physical interface ethernet port in terms of slot number and port number.

## Modes

Privileged EXEC mode

## Usage Guidelines

This command monitors 802.1x activity on all the switch ports and displays information about the devices connected to the ports that support 802.1x. You can use this feature to determine if the devices connected to the switch ports are 802.1x-capable.

When you configure the **dot1x test eapol-capable** command on an 802.1x-enabled port, and the link comes up, the port queries the connected client about its 802.1x capability. When the client responds with a notification packet, it is designated as 802.1x-capable.

The readiness check can be sent on a port that handles multiple hosts (for example, a PC that is connected to an IP phone). The readiness check is not available on a port that is configured with the command **dot1x port-control force-unauthorized**.

The readiness check is typically used before 802.1x is enabled on the switch.

802.1x authentication cannot be initiated while the 802.1x readiness test is in progress.

The 802.1x readiness test cannot be initiated while 802.1x authentication is active.

802.1x readiness can be checked on a per-interface basis. Readiness check for all interfaces at once is not supported.

## Examples

The following example configures readiness check on an interface to determine if the devices connected to the ports are 802.1x-capable.

```
device# dot1x test eapol-capable interface ethernet 1/1
device# 2016/07/18-00:49:03, [DOT1-1012], 5006, M2 | Active | DCE, INFO, sw0, DOT1X_PORT_EAPOL_CAPABLE:
Peer connected to port Ethernet 1/1 is EAPOL capable.
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# dot1x test timeout

Sets the 802.1X readiness test timeout.

## Syntax

`dot1x test timeout timeout`

## Command Default

The default readiness test interval is 10 seconds.

## Parameters

*timeout*

Specifies the readiness test interval value in seconds. Valid values range from 1 through 65535.

## Modes

Global configuration mode

## Examples

The following example sets the test timeout to 30 seconds:

```
device(config)# dot1x test timeout 30
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# dot1x timeout

Configures the timeout parameters that determine the time interval for client reauthentication and EAP retransmissions.

## Syntax

**dot1x timeout** {**re-authperiod** *seconds* | **supp-timeout** *seconds* | **tx-period** *seconds* }

**no dot1x timeout** {**re-authperiod** *seconds* | **supp-timeout** *seconds* | **tx-period** *seconds* }

## Command Default

The timeout parameters are not applied to the device.

## Parameters

### **re-authperiod** *seconds*

Specifies the interval at which clients connected to 802.1X authentication enabled ports are periodically reauthenticated. When periodic reauthentication is enabled using the **dot1x reauthentication** command, the device reauthenticates the clients every 3,600 seconds by default. The **re-authperiod** option allows you to specify the time interval between reauthentication attempts. The reauthentication interval configured using the **dot1x timeout re-authperiod** command takes precedence.

### **supp-timeout** *seconds*

Specifies the EAP response timeout for 802.1x authentication. By default, when the device relays an EAP-Request frame from the RADIUS server to the client, it expects to receive a response from the client within 30 seconds. If the client does not respond within the allotted time, the device retransmits the EAP-Request frame to the client. The timeout value for retransmission of EAP-Request frames to the client can be configured using the **supp-timeout seconds** parameters.

### **tx-period** *seconds*

Specifies the EAP request retransmission interval, in seconds, with the client. By default, if the device does not receive an EAP-response/identity frame from a client, the device waits 30 seconds, then retransmits the EAP-request/identity frame. You can optionally change the amount of time the device waits before re-transmitting the EAP-request/identity frame to the client. If the client does not send back an EAP-response/identity frame within 60 seconds, the device will transmit another EAP-request/identity frame. The tx-period is a value from 1 through 4294967295. The default is 30 seconds.

## Modes

Interface configuration mode

## Usage Guidelines

The **no** form of the command disables dot1x timeout.

## Examples

The following example sets 25 seconds as the amount of time between reauthorization attempts on a specific interface.

```
device(config)# interface Ethernet 1/1
device(conf-if-eth-1/1)# dot1x timeout re-authperiod 25
```

The following example sets 45 seconds as the switch-to-client retransmission time for the EAP request frame on a specific interface.

```
device(config)# interface Ethernet 1/1
device(conf-if-eth-1/1)# dot1x timeout supp-timeout 45
```

The following example sets 34 seconds as the waiting period for a response to an EAP-request or identity frame from the client before retransmitting the request on a specific interface.

```
device(config)# interface Ethernet 1/1
device(conf-if-eth-1/1)# dot1x timeout tx-period 34
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# dpod

Manages Dynamic Ports on Demand (POD) assignments.

## Syntax

```
dpod slot/port { reserve | release }
```

## Parameters

*slot*

Specifies a slot number.

*port*

Specifies a port number.

**reserve**

Reserves a POD assignment for a port that is currently not able to come online but is expected to be viable in the future. A port license assignment that is reserved will be associated with the first port set that has a vacancy.

**release**

Removes a port from the port set to which it is currently assigned.

## Modes

Global configuration mode

## Usage Guidelines

A port POD assignment can only be released if the port is currently offline. Enter **shutdown** to take the port offline.

Do not release a port unless you plan to disconnect the optical link or disable the port persistently. If the link (server or optical) is left in a state where the port could be brought online, the Dynamic POD mechanism will detect this unassigned port and attempt to reassign it to a port set.

## Examples

The following example reserves a POD assignment.

```
device# configure terminal
device(config)# dpod 8/15 reserve
device(config-dpod-8/15)# exit
```

The following example removes a port from a POD port set.

```
device# configure terminal
device(config)# dpod 8/15 release
device(config-dpod-8/15)# exit
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# dscp (QoS)

Defines the DSCP-to-EXP values for an MPLS QoS DSCP-to-EXP mutation map.

## Syntax

```
dscp dscp-value to exp exp-value ]
no dscp dscp-value
```

## Command Default

The default DSCP value.

## Parameters

*dscp-value*  
Specifies the DSCP value.

**exp** *exp-value*  
Specifies the EXP value.

## Modes

DSCP-EXP configuration mode

## Usage Guidelines

Use the **no** form of the command to reset the DSCP value.

## Examples

The following example defines the DSCP-to-EXP mutation map.

```
device# configure terminal
device(config)# qos-mpls map dscp-exp dscpExpMap
device(dscp-exp-dscpExpMap)# dscp 0 to exp 7
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# dscp (Tunnel)

Configures the tunnel differentiated services code point (DSCP).

## Syntax

```
dscp dscp-value
no dscp
```

## Parameters

*dscp-value*  
Specifies the DSCP value. The range is from 0 to 63.

## Command Default

The default value is 0.

## Modes

Interface tunnel configuration mode

## Usage Guidelines

Use the **no** form of this command to remove the DSCP configuration.

## Examples

This example configures DSCP value for the tunnel interface.

```
device# configure terminal
device(config)# interface tunnel 5
device(config-intf-tunnel-5)# mode gre ip
device(config-intf-tunnel-5)# source 10.1.1.10
device(config-intf-tunnel-5)# source ve 4
device(config-intf-tunnel-5)# destination 10.1.1.11
device(config-intf-tunnel-5)# router-interface ve 3
device(config-intf-tunnel-5)# dscp-ttl-mode pipe
device(config-intf-tunnel-5)# dscp 10
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# dscp-ttl-mode

Configures tunnel differentiated services code point (DSCP) time to live (TTL) mode.

## Syntax

```
dscp-ttl-mode { pipe | uniform }
no dscp-ttl-mode
```

## Command Default

By default, set to pipe mode for all tunnels.

## Parameters

**pipe**  
Specifies pipe mode.

**uniform**  
Specifies uniform mode.

## Modes

Interface tunnel configuration mode

## Usage Guidelines

Use the **no** form of this command to remove the QoS mode configuration.

Supporting the QoS mutation configuration on the VE is not supported.

## Examples

This example shows how to configure the quality of service (QoS) mode.

```
device# configure terminal
device(config)# interface tunnel 5
device(config-intf-tunnel-5)# mode gre ip
device(config-intf-tunnel-5)# source 10.1.1.10
device(config-intf-tunnel-5)# source ve 4
device(config-intf-tunnel-5)# destination 10.1.1.11
device(config-intf-tunnel-5)# router-interface ve 3
device(config-intf-tunnel-5)# dscp-ttl-mode pipe
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# duplicate-mac-timer (EVPN default instance)

Configures a duplicate MAC detection timer for the detection of continuous MAC moves.

## Syntax

**duplicate-mac-timer** *interval* **max-count** *interval*

**no duplicate-mac-timer** *interval* **max-count** *interval*

## Parameters

*interval*

Specifies the duplicate MAC detection timer interval in seconds. Valid values range from 5 through 300. The default is 5.

**max-count** *value*

Specifies the maximum threshold of MAC moves that can occur within the configured time interval before the MAC address is treated as a duplicate address and further advertisements for that MAC address are blocked. Valid values range from 3 through 10. The default is 3.

## Modes

EVPN instance configuration mode

## Usage Guidelines

The **no** form of the command restores the default values.

## Examples

The following example sets the duplicate MAC detection timer interval to 180 and the maximum count to 5 for the default EVPN instance.

```
device# configure terminal
device(config)# evpn
device(config-evpn-default)# duplicate-mac-timer 180 max-count 5
```

The following example restores the default duplicate MAC detection timer and maximum count values.

```
device# configure terminal
device(config)# evpn
device(config-evpn-default)# no duplicate-mac-timer
```

## History

Release version	Command history
17r.1.01	This command was introduced.

# dynamic-bypass

The **dynamic-bypass** command enables dynamic bypass on a MPLS router or on an Ethernet interface.

## Syntax

```
dynamic-bypass
no dynamic-bypass
```

## Command Default

There is no dynamic bypass configuration in the default mode.

## Modes

MPLS router configuration mode (config-router-mpls).

MPLS router MPLS interface dynamic bypass configuration mode (config-router-if-ethernet-slot/port).

## Usage Guidelines

Dynamic bypass is enabled or disabled in the MPLS router using this command. Upon configuring this command, the configuration mode changes to dynamic bypass and enables dynamic bypass. If the dynamic bypass is already configured under router MPLS, then there is no change in the configured state of dynamic bypass.

Use the **dynamic-bypass** command to manually enable dynamic bypass on a MPLS interface.

A dynamic bypass LSP is created to protect an interface only when

1. The dynamic bypass is globally enabled AND
2. The global dynamic bypass **enable-all-interfaces** is configured OR interface level dynamic bypass is enabled.

The **no** form of the command in the MPLS router mode removes dynamic bypass from the MPLS router, and dynamic bypass is disabled in the system. The command deletes all configurations under the router mode dynamic bypass configuration block. This command brings down and deletes all the existing dynamic bypasses in the system.

The **no** form of the command in the interface mode deletes the dynamic bypass configuration from the MPLS interface and disables dynamic bypass on the interface when the MPLS router mode **enable-all-interfaces** is not configured.

## Examples

The following example enables dynamic bypass.

```
device>configure
device(config)# router-mpls
device(config-router-mpls)# dynamic-bypass
device(config-router-mpls-dynamic-bypass)#
```

The following example configures dynamic bypass on Ethernet interface *2/8*.

```
device>configure
device(config)# router mpls
device(config-router-mpls)# mpls-interface ethernet 2/8
device(config-router-mpls-if-ethernet-2/8)# dynamic-bypass
device(config-router-mpls-if-ethernet-2/8-dynamic-bypass)#
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# Commands E - F

---

## encryption-level

Configures the encryption level to use for communication with the Remote Authentication Dial-In User Service (RADIUS) server.

### Syntax

```
encryption-level encryption_level_value ]  
no encryption-level
```

### Command Default

The default value is 7; the key is stored in encrypted format.

### Parameters

*encryption\_level\_value*

Specifies the encryption level value for shared-secret key operation. Valid values are 0 and 7. A value of 0 specifies that the key is stored in cleartext format. A value of 7 specifies that the key is stored in encrypted format. The default value is 7.

### Modes

RADIUS server host VRF configuration mode

### Usage Guidelines

The **no** form of the command restores the command default value.

#### NOTE

Before downgrading to a software version that does not support the **encryption-level** command, set the encryption level value to 0. Otherwise, the firmware download displays an error requesting that the encryption level value be set to 0.

### Examples

The following example shows how to specify an encryption level of 0; the shared secret key is stored in cleartext format

```
device# configure terminal  
device(config)# radius-server host 10.37.73.180 use-vrf green-vrf  
device(config-host-10.37.73.180/green-vrf)# encryption-level 0
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# enforce-first-as

Enforces the use of the first autonomous system (AS) path for external BGP (eBGP) routes.

## Syntax

`enforce-first-as`

`no enforce-first-as`

## Modes

BGP configuration mode

## Usage Guidelines

This command causes the router to discard updates received from eBGP peers that do not list their AS number as the first AS path segment in the AS\_PATH attribute of the incoming route.

The **no** form of the command disables this feature.

## Examples

The following example configures the device to enforce the use of the first AS path.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# enforce-first-as
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# enable

Enables the bypass LSP.

## Syntax

**enable**  
**no enable**

## Command Default

The default value is disabled.

## Modes

MPLS router bypass LSP configuration mode

## Usage Guidelines

Enable the bypass LSP only after configuring the **to-address** and **exclude-interface**.

The **no** form of the command disables the bypass LSP.

## Examples

The following example enables the bypass LSP with the name my-bypass-lsp.

```
device>configure
device(config)# router mpls
device(config-router-mpls)# bypass-lsp my-bypass-lsp
device(config-router-mpls-bypass-lsp-my-bypass-lsp)# enable
```

## History

Release version	Command history
17r.1.00	This command was introduced.



# enable-all-interfaces

Use the `enable-all-interfaces` command to enable dynamic bypass on all the MPLS interfaces. This command disables dynamic bypass on all interfaces where dynamic bypass is not disabled using the interface level commands. MPLS interface specific dynamic bypass configurations take precedence over this configuration.

## Syntax

```
enable-all-interfaces
no enable-all-interfaces
```

## Command Default

Disabled on all interfaces unless the user enables dynamic bypass on the MPLS interfaces.

## Modes

MPLS router dynamic bypass configuration mode (`config-router-mpls-dynamic-bypass`).

## Usage Guidelines

The `no` form of the command disables dynamic bypass on all interfaces where dynamic bypass is not enabled using the interface level commands.

## Examples

The following example enables dynamic bypass on all interfaces.

```
device>configure
device(config)# router mpls
device(config-router-mpls)# dynamic-bypass
device(config-router-mpls-dynamic-bypass)# enable-all-interfaces
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# eol

Enables the end-of-lib configuration mode.

## Syntax

```
eol
no eol
```

## Modes

MPLS LDP configuration mode

## Usage Guidelines

Use the **no** form of this command to remove this mode and attribute under it.

The end-of-lib mode contains all the attributes of the end of lib capability and notification. Also, when you enable the end-of-lib mode, you can determine whether the two RFCs 5561 and 5919 are enabled by the LSR.

## Examples

The following example enables the end-of-lib configuration mode.

```
device(config)# router mpls
device(config-router-mpls)# ldp
device(config-router-mpls-ldp)# eol
device(config-router-mpls-ldp-eol)#
```

## History

Release version	Command history
16r. 1.00	This command was introduced.

# error-disable-timeout enable

Enables the timer to bring the interface out of the error-disabled state.

## Syntax

```
error-disable-timeout enable
```

## Modes

Spanning tree configuration mode

## Usage Guidelines

When the Spanning Tree Protocol (STP) Bridge Protocol Data Unit (BPDU) guard disables a port, the port remains in the disabled state unless the port is enabled manually. This command allows you to enable the interface from the disabled state.

The command is the same regardless of which type of STP is enabled.

## Examples

To bring the interface out of the disabled state:

```
device# configure terminal
device(config)# protocol spanning-tree stp
device(conf-stp)# error-disable-timeout enable

device# configure terminal
device(config)# protocol spanning-tree rstp
device(conf-rstp)# error-disable-timeout enable

device# configure terminal
device(config)# protocol spanning-tree mstp
device(conf-mstp)# error-disable-timeout enable

device# configure terminal
device(config)# protocol spanning-tree pvst
device(conf-pvst)# error-disable-timeout enable

device# configure terminal
device(config)# protocol spanning-tree rpvt
device(conf-rpvst)# error-disable-timeout enable
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# error-disable-timeout interval

Sets the timeout interval for errors on an interface.

## Syntax

**error-disable-timeout interval** *seconds*

**no error-disable-timeout interval**

## Command Default

300 seconds

The timeout feature is disabled.

## Parameters

*seconds*

Specifies the time for the interface to time out. Valid values range from 10 through 1000000 seconds.

## Modes

Spanning tree configuration mode

## Usage Guidelines

Enter **no error-disable-timeout interval** to return to the default setting.

The command is the same regardless of which type of STP is enabled.

## Examples

Follow these examples to set the timeout interval.

```
device# configure terminal
device(config)# protocol spanning-tree stp
device(conf-stp)# error-disable-timeout interval 100
```

```
device# configure terminal
device(config)# protocol spanning-tree rstp
device(conf-rstp)# error-disable-timeout interval 100
```

```
device# configure terminal
device(config)# protocol spanning-tree mstp
device(conf-mstp)# error-disable-timeout interval 100
```

```
device# configure terminal
device(config)# protocol spanning-tree pvst
device(conf-pvst)# error-disable-timeout interval 100
```

```
device# configure terminal
device(config)# protocol spanning-tree rpvt
device(conf-rpvst)# error-disable-timeout interval 100
```

## History

Release version	Command history
16r.1.00	This command was introduced.

## esi

Sets the Ethernet Segment ID (ESI) value which is used to uniquely identify the client or pseudowire (PW) client for the MCT client.

## Syntax

```
esi HH:HH:HH:HH:HH:HH:HH:HH:HH
no esi HH:HH:HH:HH:HH:HH:HH:HH:HH
```

## Parameters

*HH:HH:HH:HH:HH:HH:HH:HH:HH*  
Specifies the 9-octet ESI value. Enter *HH* in hexadecimal format.

## Modes

Cluster client configuration mode  
Cluster client PW configuration mode

## Usage Guidelines

Use the **no** form of the command to delete the ESI setting for the client.  
Only one ESI is allowed under a client.  
You must configure the same ESI value on both devices in an MCT cluster.  
For an MCT client, the configuration of the ESI value creates the MCT client LAG.  
The same ESI cannot be added under multiple client entries.

## Examples

The following example shows the setting of the ESI for the cluster client.

```
device(config)# cluster MCT1 1
device(config-cluster-1)# client MCT1-client 200
device(config-cluster-client-200)# esi 00.a1.b2.c3.d4.e5.f6.89.00
```

The following example shows the setting of the ESI for the cluster PW client.

```
device(config)# cluster MCT1 1
device(config-cluster-1)# client-pw
device(config-cluster-client-pw)# esi 01:02:03:04:05:06:07:08:0a
```

## History

Release version	Command history
16r.1.01	This command was introduced.

Release version	Command history
17r.1.01	This command under cluster client PW configuration mode was introduced.

## event

Configures an event and action.

## Syntax

```
event{ average-threshold | max-threshold | ccm-down | ccm-up } actions { interface-down | event-handler | all }
no event
```

## Parameters:

*average-threshold*

Specifies average threshold.

*max-threshold*

Specifies maximum threshold.

*ccm-down*

Specifies CCM is down

*ccm-up*

Specifies CCM is up.

**actions**

Specifies the actions.

*interface-down*

Specifies interface down.

*event-handler*

Specifies event handler.

*all*

Specifies all.

## Modes

Y1731 configuration mode

## Usage Guidelines

Use the **no** form of the command delete the corresponding configured action profile also corresponding associations with Source and Target MEP pair.

## Examples

This example shows how to create an action profile.

```
device# configure terminal
device(config)# protocol cfm
device(config-cfm)# y1731
device(config-cfm-y1731)# action-profile action-prof-act1
device((protocol-cfm)# event max-threshold actions all
```



## History

Release version	Command history
17r.1.01	This command was introduced.

# event-handler

Creates or accesses an event-handler profile, which can execute a Python script when a specified trigger occurs.

## Syntax

**event-handler** *event-handler-name* [ **action** **python-script** *file-name* ]

**event-handler** *event-handler-name* [ **description** *description-text* ]

**event-handler** *event-handler-name* [ **trigger** *trigger-id* **raslog** *raslog-id* [ **pattern** *posix-ext-regex* ] ]

**no event-handler** *event-handler-name*

## Command Default

No event-handler profile is enabled.

## Parameters

*event-handler-name*

Specifies the name of the event-handler profile. Valid values can have from 1 through 32 characters. The first character must be alphabetic.

**action** **python-script** *file-name*

Specifies a Python file that runs when a trigger-condition occurs. Valid values range from 4 through 32 characters (including the **.py** extension). The first character must be alphanumeric.

**description** *description-text*

Specifies a string describing the event-handler profile. The string can be 1 through 128 ASCII characters in length. Do not use the ? character. If you need to use ! or \, precede each with \.

**trigger** *trigger-id*

Defines an event-handler trigger and specifies an ID number for the trigger. Valid values are 1 through 100, and must be unique per event-handler profile. When the trigger-condition occurs, a Python script is run.

**raslog** *raslog-id*

Specifies a RASlog message ID as the trigger.

**pattern** *posix-ext-regex*

Specifies a POSIX extended regular expression to search for a match within the specified RASlog message ID. For examples, refer to the "trigger" topic.

## Modes

Global configuration mode

Event-handler configuration mode for an existing event handler. (There is no need to enter the **exit** command to return to global configuration mode.)

## Usage Guidelines

You can create multiple event-handler profiles.

You can optionally specify a description, a trigger, or the Python script with this command; or specify them later.

An **event-handler** command creates or accesses an event-handler profile and can also define one of the following parameters:

- Description
- One trigger
- The Python-script action that runs on any trigger

You can also define the above parameters—including one or more triggers—from event-handler configuration mode.

A Python event-handler script runs only if all of the following occur:

- Using the **copy** command, copy the Python file to the `flash://` location on the device.
- Using the **event-handler** command, create an event-handler profile.
- Either using the **event-handler** command or in configuration mode for that profile:
  - Using the **trigger** command, create one or more triggers.
  - Using the **action** command, specify the Python script that will be triggered.
- Using the **event-handler activate** command, activate an instance of the event handler.
- The trigger event occurs.

If an event-handler profile is not activated, the **no** form of this command deletes it.

## Examples

The following example creates an event-handler profile and accesses its configuration mode.

```
device# configure terminal
device(config)# event-handler eventHandler1
device(config-event-handler-eventHandler1)#
```

## History

Release version	Command history
16r.1.00	This command was introduced.
17r.1.00	The command was modified to support POSIX extended regular expressions for a match within a specified RASlog message ID. Descriptions are also supported.

# event-handler abort action

Under Python event-management, aborts a specified event handler that is currently running.

## Syntax

**event-handler abort action** *event-handler-name*

## Parameters

*event-handler-name*

Specifies the name of the event-handler profile. Valid values can have from 1 through 32 characters. The first character must be alphabetic.

## Modes

Privileged EXEC mode

## Examples

The following command successfully aborted event-handler action "eh1".

```
device# event-handler abort action eh1
This operation will abort an event handler action that is currently running and may leave the switch in
an inconsistent state. Do you want to continue? [y/n]:y
Operation completed successfully.
```

## History

Release version	Command history
16r.1.00	This command was introduced.
17r.1.00	The command was changed from <b>clear event-handler action</b> to <b>event-handler abort action</b> .

# event-handler activate

Activates an event handler and accesses event-handler activation mode, from which you can enter advanced configuration commands. You can also append the advanced commands to **event-handler activate**.

## Syntax

**event-handler activate** *event-handler-name*

**event-handler activate** *event-handler-name* [ **action-timeout** *minutes* ] [ **delay** *seconds* ] [ **iterations** *num-iterations* ] [ **interval** *seconds* ] [ **trigger-mode** *mode* ] [ **trigger-function** { **OR** | **AND** [ **time-window** *seconds* ] }

**no event-handler activate** *event-handler-name*

## Command Default

No event handler is activated on the device.

## Parameters

*event-handler-name*

Specifies the name of the event-handler profile. Valid values can have from 1 through 32 characters. The first character must be alphabetic.

**action-timeout** *minutes*

Specifies the number of minutes to wait for an action-script to complete execution. If you specify "0", no timeout is set. Valid timeout values are any positive integer.

**delay** *seconds*

Specifies a number of seconds from when a trigger is received until the execution of the specified action begins. Valid values are 0 or a positive integer.

**iterations** *num-iterations*

Specifies the number of times an event-handler action is run, when triggered. Valid values are any positive integer. The default value is 1.

**interval** *seconds*

Specifies the number of seconds between iterations of an event-handler action, if triggered. Valid values are 0 or a positive integer. The default is 0.

**trigger-mode** *mode*

Specifies if an event-handler action can be triggered only once or more than once. The default is each time the trigger condition occurs, the event-handler action is launched.

**each-instance**

The event-handler action is launched on each trigger instance received.

**on-first-instance**

As long as the device is running, the event-handler action is launched only once. Following a device restart, the event-handler action can be triggered again.

**only-once**

For the duration of a device's configuration, the event-handler action is launched only once.

**trigger-function**

For an implementation of an event-handler profile, if multiple triggers are defined for an event-handler action, specifies if the action runs only if all of the triggers occur; or if one is sufficient.

**OR**

The event-handler action runs if any of the triggers occur.

**AND**

The event-handler action runs only if all of the triggers occur.

**time-window** *seconds*

In seconds, specify the time window within which all of the triggers must occur in order that the event-handler action runs. Once all triggers have been received and on each subsequent trigger received, the action will be launched when the time difference between the latest trigger and the oldest trigger is less than or equal to the configured time-window.

## Modes

Global configuration mode

Event-handler activation mode for an existing event handler. (There is no need to enter the **exit** command.)

## Usage Guidelines

You can activate up to 10 different event-handler profiles on a device.

A Python event-handler script runs only if all of the following occur:

- Using the **copy** command, copy the Python file to the `flash://` location on the device.
- Using the **event-handler** command, create an event-handler profile.
- In configuration mode for that profile:
  - Using the **trigger** command, create one or more triggers.
  - Using the **action** command, specify the Python script that will be triggered.
- Using the **event-handler activate** command, activate an instance of the event handler.
- The trigger event occurs.

Following an initial triggering of an event-handler action, any subsequent trigger launches the action an additional time if the following conditions are true:

- The **trigger-mode** parameter is set to the default **each-instance**.
- The subsequent trigger occurs within the specified **time-window**.

For additional usage guidelines regarding the advanced configuration commands, see the following topics:

- **action-timeout**
- **delay**
- **iterations**
- **interval**
- **trigger-mode**
- **trigger-function**

To inactivate an event-handler instance on a device, use the **no** form of this command. If an event-handler Python script is running, it is executed to completion before inactivation of the event handler.

## Examples

This example activates eventHandler1 on the device.

```
device# configure terminal
event-handler activate eventHandler1
device(config-activate-eventHandler1)#
```

## History

Release version	Command history
16r.1.00	This command was introduced.
17r.1.00	This command was modified to support the <b>action-timeout</b> parameter.

# evpn

Enables EVPN instance configuration mode.

## Syntax

**evpn**

**no evpn**

## Command Default

This mode is disabled.

## Modes

Global configuration mode

## Usage Guidelines

Use the **no** form of this command to disable EVPN instance configuration mode.

## Examples

```
device# configure terminal
device(config)# evpn
device(config-evpn-default)#
```

## History

Release version	Command history
17r.1.01	This command was introduced.



# exclude-any

Interfaces that are not part of these groups, as well as interfaces that are not part of any group, are eliminated from consideration.

## Syntax

**exclude-any** *admin\_group\_name* | *admin\_group\_name* [*admin\_group\_name* | *admin\_group\_name* ]

**no exclude-any** *admin\_group\_name* | *admin\_group\_name* [*admin\_group\_name* | *admin\_group\_name* ]

## Command Default

There are no excluded interfaces in the command default mode.

## Parameters

*name*

Specifies the group, by name, the interface must be a member of. The name can be the name of the administrative group to which an administrative group number is associated by configuration in router MPLS mode. More than one parameter can be provided.

*number*

Specifies the group, by number, the interface must be a member of. Number can be from 0 to 31 representing 32 admin groups. More than one parameter can be provided.

## Modes

MPLS LSP configuration mode (`config-router-mpls lsp-lsp_name`).

MPLS router Bypass LSP configuration mode (`config-router-mpls-bypass-lsp-lsp_name`).

MPLS router MPLS interface dynamic bypass configuration mode (`config-router-mpls-if-ethernet-slot/port-dynamic-bypass`)

## Usage Guidelines

More than one group may be configured at a time.

Use the interface level **exclude-any** command to configure administrative groups for dynamic bypass LSPs to be created corresponding to a protected link.

The **no** form of the command removes the interface administrative group configuration.

## Examples

The following example eliminates interfaces in either administrative group *gold* or *silver* when the path for LSP *tunnel1* is calculated.

```
device# configure
device(config)# router mpls
device(config-router-mpls)# lsp tunnel1
device(config-router-mpls-lsp-tunnel1)# exclude-any gold silver
```

exclude-any

The following example eliminates bypass LSP administration groups *15* and *16* .

```
device# configure
device(config)# router mpls
device(config-router-mpls)# bypass-lsp my-bypass-lsp
device(config-router-mpls-bypass-lsp-my-bypass-lsp)# exclude any 15 16
```

The following example eliminates groups *10* and *11* from consideration for dynamic bypass MPLS Ethernet interface *2/8*.

```
device# configure
device(config)# router mpls
device(config-router-mpls)# mpls-interface ethernet 2/8
device(config-router-mpls-if-ethernet-2/8)# dynamic-bypass
device(config-router-mpls-if-ethernet-2/8-dynamic-bypass)# exclude-any 10 11
```

## History

Release version	Command history
16r.1.00	This command was introduced.
17r.1.00	This command was modified to include MPLS bypass LSP information.

# exclude-interface

Configures one or more exclude interfaces for the bypass LSP.

## Syntax

```
exclude-interface { [ ethernet slot/port | ve ve-num ] }
no exclude-interface { [ ethernet slot/port | ve ve_num ] }
```

## Command Default

There is no default value. This is a mandatory parameter.

## Parameters

**ethernet** *slot/port*  
Specifies the physical slot and port on the Ethernet interface.

**ve** *ve\_num*  
Specifies the Virtual Ethernet (VE) number on the VE interface.

## Modes

MPLS router Bypass LSP configuration mode.

## Usage Guidelines

The **no** form of this command removes an exclude interface of the bypass LSP.

The user can configure one or more exclude interfaces for the bypass LSP. The interface can be an Ethernet or a virtual Ethernet type. To enable a bypass LSP, the system requires at least one exclude interface configuration.

## Examples

The following example excludes Ethernet interface 2/8 on bypass LSP *my-bypass-lsp*.

```
device>configure
device(config)# router mpls
device(config-router-mpls)# bypass-lsp my-bypass-lsp
device(config-router-mpls-bypass-lsp-my-bypass-lsp)# exclude-interface Ethernet 2/8
```

the following example excludes VE interface 108 on bypass LSP *my-bypass-lsp*.

```
device>configure
device(config)# router mpls
device(config-router-mpls)# bypass-lsp my-bypass-lsp
device(config-router-mpls-bypass-lsp-my-bypass-lsp)# exclude-interface ve 108
```

## History

Release version	Command history
17r.1.00	This command was introduced.

## exp

Defines the QoS MPLS EXP-to-DSCP or EXP-to-traffic class mutation mapping.

## Syntax

```
exp exp-value to { dscp dscp-value } | { traffic class traffic-class-value drop-precedence }
no exp exp-value
```

## Command Default

The default EXP-to-DSCP mapping is as follows:

```
Exp      : 0  1  2  3  4  5  6  7
-----
Dscp     : 0  8 16 24 32 40 48 56
```

The default EXP-to-traffic class mapping with the drop precedence is as follows:

```
Exp      : 0  1  2  3  4  5  6  7
-----
traffic-class : 0  1  2  3  4  5  6  7
drop-precedence : 0  0  0  0  0  0  0  0
```

## Parameters

*exp-value*

Specifies the EXP value. Enter an integer from 0 through 7.

**dscp** *dscp-value*

Specifies the DSCP value. Enter an integer from 0 through 63.

**traffic class** *traffic-class-value*

Specifies the traffic class value. Enter an integer from 0 through 7.

**drop-precedence**

Specifies the drop precedence for the traffic class. Enter an integer from 0 through 3.

## Modes

QoS MPLS map EXP-DSCP and EXP-traffic-class configuration mode

## Usage Guidelines

After configuring the mutation mapping, you can apply the map globally.

Use the **no** form of this command to reset the default mapping.

## Examples

The following example is an MPLS QoS EXP-to-DSCP mutation map configuration.

```
device# configure terminal
device(config)# qos-mpls map exp-dscp expDscpMap
device(exp-dscp-expDscpMap)# exp 0 to dscp 7
device(exp-dscp-expDscpMap)# exp 1 to dscp 23
device(exp-dscp-expDscpMap)# exp 3 to dscp 31
```

The following example is an MPLS QoS EXP-to-traffic class mutation map configuration.

```
device# configure terminal
device(config)# qos-mpls map exp-traffic-class expTcMap
device(exp-traffic-class-expTcMap)# exp 0 to traffic-class 7 drop-precedence 0
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# export-vrf-leaked-routes

Allows exporting VRF leaked routes to Layer VPN.

## Syntax

`export-vrf-leaked-routes`

`no export-vrf-leaked-routes`

## Modes

BGP address-family IPv4 unicast VRF configuration mode

## Usage Guidelines

The `no` form of the command disables exporting VRF leaked routes to Layer VPN.

## Examples

This example shows how to export VRF leaked routes to Layer VPN.

```
device# configure terminal
device(config)# router bgp
device(config-bgp)# address-family vpnv4 unicast
device(config-bgp-vpnv4u)# export-vrf-leaked-routes
```

## History

Release version	Command history
17r.1.01	This command was introduced.

# export-map

Exports the target-VPN community.

## Syntax

**export-map** *route-map*

**no export-map** *route-map*

## Parameters

*route-map*

Specifies the route-map name.

## Modes

VRF configuration mode

## Usage Guidelines

The **no** form of the command to apply a route-map filter on the routes to be exported.

## Examples

The following example shows how to export the target-VPN community.

```
device# configure terminal
device(config)# vrf vpn1
device(config-vrf-vpn1)# rd 1:2
device(config-vrf-vpn1)# vpn-statistics
device(config-vrf-vpn1)# address-family ipv4 unicast
device(config-vrf-vpn1-ipv4-unicast)# route-target-import 100:1
device(config-vrf-vpn1-ipv4-unicast)# export-map import-route-map1
```

## History

Release version	Command history
17r.1.01	This command was introduced.



# extend bridge-domain

Configures a bridge domain (BD) to a site for a VXLAN Layer 2 gateway.

## Syntax

```
extend bridge-domain { add | remove } bridge_domain_id
```

## Parameters

### add

Adds a bridge-domain ID to a tunnel.

### remove

Removes a bridge-domain ID from a tunnel.

### *bridge\_domain\_id*

Specifies the configured bridge domain ID.

## Modes

Site configuration mode

## Examples

The following example configures the bridge domain to the site of the VXLAN Layer 2 gateway.

```
device# configure terminal
device(config)# overlay-gateway gateway1
device(config-overlay-gw-gateway1)# site mysite
device(config-overlay-gw-gateway1-site-mysite)# extend bridge-domain add 10
```

## History

Release version	Command history
17r.1.01	This command was introduced.

## extend vlan

Configures switchport VLANs for the tunnels to the containing site in VXLAN overlay gateway configurations.

### Syntax

```
extend vlan { add | remove } vlan_id
no extend vlan
```

### Parameters

#### add

Specifies a VLAN ID or range of VLAN IDs to be added to a tunnel.

#### remove

Specifies a VLAN ID or range of VLAN IDs to be removed from a tunnel.

#### *vlan\_id*

A VLAN ID or range of VLAN IDs. See the Usage Guidelines.

### Modes

VXLAN overlay gateway site configuration mode

### Usage Guidelines

The VXLAN Network Identifier (VNI) classification is derived from the "map vlan" configuration of the parent overlay gateway. This command results in the provisioning or unprovisioning of the VLANs. Use the **no extend vlan *vlan\_id*** command to unprovision a VLAN.

All of the VLAN IDs that are specified must be VLANs that have been mapped by means of the **map vlan *vlan\_id* vni *vni*** command on the parent overlay gateway, unless automatic VNI mapping has been enabled by means of the **map vlan vni auto** command.

Use the **no attach vlan *vlan\_id*** command to remove all switchport configurations from the tunnels to the containing site.

### Examples

Use the **no attach vlan *vlan\_id*** command to remove all switchport configurations from the tunnels to the containing

To configure a switchport VLAN and range of VLANs:

```
device# configure terminal
device(config)# overlay-gateway gateway1
device(config-overlay-gw-gateway1)# site mysite
device(config-overlay-gw-gateway1-site-mysite)# extend vlan add 10,20-30
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# external-lsdb-limit (OSPFv2)

Configures the maximum size of the external link state database (LSDB).

## Syntax

```
external-lsdb-limit value
no external-lsdb-limit
```

## Parameters

*value*

Maximum size of the external LSDB. Valid values range from 1 through 14913080. The default is 14913080.

## Modes

OSPF router configuration mode  
OSPF router VRF configuration mode

## Usage Guidelines

If you change the value, make sure to save the running-config file and reload the software. The change does not take effect until you reload or reboot the software.

The **no** form of the command restores the default setting.

## Examples

The following example sets the limit of the LSDB to 20000.

```
device# configure terminal
device(config)# router ospf
device(config-router-ospf-vrf-default-vrf)# external-lsdb-limit 20000
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# external-lsdb-limit (OSPFv3)

Configures the maximum size of the external link state database (LSDB).

## Syntax

```
external-lsdb-limit value
no external-lsdb-limit
```

## Parameters

*value*

Maximum size of the external LSDB. Valid values range from 1 through 250000. The default is 250000.

## Modes

OSPFv3 router configuration mode  
OSPFv3 router VRF configuration mode

## Usage Guidelines

If you change the value, you must save the running-config file and reload the software. The change does not take effect until you reload or reboot the software.

The **no** form of command reverts to the default setting.

## Examples

The following example sets the limit of the external LSDB to 15000.

```
device# configure terminal
device(config)# ipv6 router ospf
device(config-ipv6-router-ospf-vrf-default-vrf)# external-lsdb-limit 15000
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# facility-backup

Enables facility backup (many-to-one) Fast Reroute (FRR) on a Label Switched Path (LSP).

## Syntax

```
facility-backup [ bandwidth | exclude-any name | hop-limit name | include-all | include-any | link-protection | priority |
revertive ]
```

```
no facility-backup [ bandwidth | exclude-any name | hop-limit name | include-all | include-any | link-protection | priority |
revertive ]
```

## Command Default

By default, a FRR LSP is a one-to-one (detour) protection LSP with the desired node protection.

## Parameters

### bandwidth

Specifies the bandwidth for the detour or backup LSP.

### exclude-any *name*

Excludes any of the specified administrative groups.

### hop-limit *num*

Specifies the limit of hops the detour or backup LSP can traverse.

### include-all

Specifies to include all of the administrative groups.

### include-any

Specifies to include any of the administrative groups.

### link-protection

Requests link protection for the LSP.

### priority

Requests setup and hold priorities.

### revertive

Activates FRR revertiveness.

## Modes

MPLS router LSP FRR configuration mode.

## Usage Guidelines

When enabled at every Point of Local Repair (PLR), the LSP outgoing interface is expected to be protected by a bypass LSP. The user can create bypass LSPs manually or they can be created automatically using dynamic bypass.

The **no** form of the command sets the FRR LSP to the detour (one-to-one) mode.

## Examples

The following example enables facility backup on LSP named *my-fbkup-lsp*.

```
device>configure
device(config)# router mpls
device(config-router-mpls)#lsp my-fbkup-lsp
device(config-router-mpls-lsp-my-fbkup-lsp)# frr
device(config-router-mpls-lsp-my-fbkup-lsp-frr)# facility-backup
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# fast-external-fallover

Resets the session if a link to an eBGP peer goes down.

## Syntax

```
fast-external-fallover
no fast-external-fallover
```

## Modes

BGP configuration mode

## Usage Guidelines

Use this command to terminate and reset external BGP sessions of a directly adjacent peer if the link to the peer goes down, without waiting for the timer, set by the BGP **timers** command, to expire. This can improve BGP convergence time, but can also lead to instability in the BGP routing table as a result of a flapping interface.

## Examples

The following example configures the device to reset the session if a link to an eBGP peer goes down.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# fast-external-fallover
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# fast-flood

Configures Intermediate System-to-Intermediate System (IS-IS) to flood Link State PDUs to other devices in the network before running SPF.

## Syntax

**fast-flood** *lsp-count*

**no fast-flood** *sp-count*

## Command Default

Four LSPs are flooded before running SPF.

## Parameters

*lsp-count*

Specifies the number of LSPs that must be flooded before running SPF. Valid values range from 1 through 15. The default value is 4.

## Modes

IS-IS router configuration mode

## Usage Guidelines

The **no** form of the command resets the LSP count to the default value of 4.

## Examples

The following example configures IS-IS to flood 10 LSPs before running SPF.

```
device# configure terminal
device(config)# router isis
device(config-isis-router)# fast-flood 10
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# fastboot

Reboots the management module on which the command is executed.

## Syntax

**fastboot**

## Modes

Privileged EXEC mode

## Usage Guidelines

All reboot operations are disruptive, and the commands prompt for confirmation before executing. When you reboot a device, all traffic to and from it stops. All ports on that device remain inactive until the device comes back online.

Any unsaved configurations are lost.

If you log in to the device IP address and enter this command, only the active management module reboots and POST is bypassed.

## Examples

The following example shows the use of the **fastboot** command.

```
device# fastboot
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# filter-fec-in

Configures LDP inbound or outbound FEC filtering to filter inbound label bindings on a MPLS router.

## Syntax

**filter-fec-in** *prefix-list-name*

**no filter-fec-in** *prefix-list-name*

## Command Default

By default, LDP distributes all FECs that are learned locally or from LDP neighbors to all other LDP neighbors.

## Parameters

*prefix-list-name*

Specifies the prefix-list name.

## Modes

MPLS LDP configuration mode

## Usage Guidelines

Use the **no** form of this command to remove the FEC filtering configuration.

LDP inbound-FEC filtering allows the control the amount of memory and CPU processing involved in installing and advertising label bindings not used for forwarding. It also serves as a tool to avoid DOS attack. For inbound FEC filter, consider the following:

- The FECs filtered by the LDP inbound-FEC filter do not install in the forwarding plane or advertise to the upstream neighbors. The FEC remains in the retained state.
- The LDP inbound-FEC filter are changed directly without deleting the one previously configured. The change automatically applies and triggers the filtering of inbound FECs.
- Changes to a referenced prefix-list automatically applies to LDP inbound-FEC filtering. This triggers filtering by way of the new configuration, filtering any existing FECs which violate the filter.
- To allow multiple route filter updates, the device waits for default 10 seconds before notifying the application of the filter change. The time for notification is configurable.
- When the LDP inbound-FEC filter is not configured, LDP does not filter any inbound FECs.
- By default, when the prefix-list referenced by the LDP inbound-FEC filter has no configuration, it is an implicit deny. All inbound FECs are filtered out and retained. The behavior is the same when the prefix list is deleted after setting it in the inbound FEC filter configuration. This behavior is consistent with other protocols which use device filters and also with the use of the **advertise-fec** command for LDP route injection.
- Inbound FEC filtering is applicable only for Layer 3 FECs and not for VC FECs. Inbound FEC filtering is not applicable for Layer 2 VPNs.

## Examples

The following example configures the LDP inbound-FEC filter.

```
device# configure terminal
device(config)# ip prefix-list list-abc permit 10.20.20.0/24
device(config)# router mpls
device(config-router-mpls)# ldp
device(config-router-mpls-ldp)# filter-fec-in list-abc
```

## History

Release version	Command history
16r. 1.00	This command was introduced.

# filter-fec-out

Configures LDP outbound FEC filtering to filter outbound label bindings on a MPLS router.

## Syntax

**filter-fec-out** *prefix-list-name*

**no filter-fec-out** *prefix-list-name*

## Command Default

By default, LDP distributes all FECs that are learned locally or from LDP neighbors to all other LDP neighbors.

## Parameters

*prefix-list-name*

Specifies the prefix-list name.

## Modes

MPLS LDP configuration mode

## Usage Guidelines

Use the **no** form of this command to remove the FEC filtering configuration.

LDP outbound FEC filtering gives you the ability to control which FECs can be advertised and to which LDP neighbors. It also reduces the number of labels distributed to neighbors and the number of messages exchanged with peers. Through this filtering, LDP scalability and convergence, security, and performance are improved.

## Examples

The following example configures the LDP outbound-FEC filter.

```
device# configure terminal
device(config)# ip prefix-list list-out deny 10.40.40.0/24
device(config)# ip prefix-list list-out permit 0.0.0.0/0 ge 32
device(config)# router mpls
device(config-router-mpls)# ldp
device(config-router-mpls-ldp)# filter-fec-out list-out
```

## History

Release version	Command history
16r. 1.00	This command was introduced.

# firmware activate

Activates the firmware that was downloaded with `firmware download noactivate` command.

## Syntax

```
firmware activate
```

## Command Default

Activation of the firmware is performed manually by default after a download.

## Modes

Privileged EXEC mode

## Usage Guidelines

By default, the **firmware download** command downloads the firmware to the system, reboots the system, and commits the firmware automatically. You can specify the **noactivate** parameter to download the firmware to the system without activating it (the node is not rebooted). The user can run the **firmware activate** command later to activate the firmware.

## Examples

To activate firmware on the device:

```
device# firmware activate
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# firmware commit

Commits a firmware upgrade.

## Syntax

```
firmware commit
```

## Modes

Privileged EXEC mode

## Usage Guidelines

The **firmware download** command updates the secondary partitions only. When the **firmware download** command completes successfully and the device reboots, the system swaps partitions. The primary partition (with the previous firmware) becomes the secondary partition, and the secondary partition (with the new firmware) becomes the primary partition.

By default, **firmware download** automatically commits the firmware after the device reboots. If you disable auto-commit mode when running **firmware download**, you must execute **firmware commit** to commit the new firmware to the secondary partition.

You must run the **firmware download** command with the **nocommit** parameter set for the following firmware commit operation to succeed.

## Examples

To commit the firmware:

```
device# firmware commit

Validating primary partition...
Doing firmwarecommit now.
Please wait ...
Replicating kernel image
.....
FirmwareCommit completes successfully.
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# firmware download

Downloads the firmware on the local device.

## Syntax

```
firmware download { default-config | ftp | scp | sftp | tftp | usb | interactive } [ manual ] [ nocommit ] [ noreboot ] [ noactivate ]
  [ coldboot ] host { hostname | host_ip_address } user username password password directory directory [ file file_name ]
  [ use-vrf vrf-name ]
```

## Command Default

By default, **firmware download** downloads the firmware to the system, reboots the system, and commits the firmware automatically. The user can specify **noactivate** to download the firmware to the system without activating it (the node is not rebooted). You can run the **firmware activate** command later to activate the firmware.

## Parameters

### default-config

Sets the configuration back to default except for the following parameters.

### ftp | scp | sftp | usb

Valid protocols are **ftp** (File Transfer Protocol), **scp** (Secure Copy), **sftp** (SSH File Transfer Protocol), **tftp** (Trivial File Transfer Protocol), or **usb** (Universal Serial Bus). The values are not case-sensitive.

### interactive

Runs firmware download in interactive mode. You are prompted for input.

### manual

Updates a single management module in a chassis with two management modules. You must log in to the management module through its dedicated management IP address. This parameter is ignored when issued on a Top-of-Rack (ToR) device or in a chassis with only one management module.

### nocommit

Disables auto-commit mode. When auto-commit mode is disabled, firmware is downloaded only to the primary partition. You must execute the firmware **commit** command manually to propagate the new image to the secondary partition.

### noreboot

Disables auto-reboot mode. When auto-reboot mode is disabled, you must reboot the device manually.

### noactivate

Downloads the firmware to the system without activating it, so the device is not automatically rebooted. You can run the **firmware activate** command later to activate the firmware.

### coldboot

Downloads the firmware to the system and reboots the device.

### host

Specifies the host by DNS name or IP address.

*hostname*

Specifies an IPv4 DNS host name.



*host\_ip\_address*

Specifies the host IP address. IPv4 and IPv6 addresses are supported.

**directory** *directory*

Specifies a fully qualified path to the directory where the firmware is located.

**file** *file\_name*

Specifies the firmware .plist file. This parameter is optional; if unspecified, the default file, release.plist, is used.

**user** *username*

Specifies the user login name for the host.

**password** *password*

Specifies the account password.

**use-vrf** *vrf-id*

Use this option to specify the name of the VRF where the host is located. If this option is not set, mgmt-vrf is used by default.

## Modes

Privileged EXEC mode

## Usage Guidelines

You can use one of the following options for firmware upgrade/downgrade: coldboot, or default-config.

The coldboot and default-config options involve system reboots and are disruptive to traffic.

In addition, default-config causes the loss of configuration because it resets the configuration back to the default settings during the firmware upgrade process.

If the **firmware download** command is interrupted because of an unexpected reboot, such as a result of a software error or power failure, the command automatically recovers the corrupted secondary partition. Wait for the recovery to complete before beginning another firmware download.

## Examples

Example of firmware download with the **coldboot** option:

```
device# firmware download ftp directory /buildsjc/sre/SQA/slxos/17r.1.00/17r.1.00 host 10.31.2.27 user
releaseuser password releaseuser coldboot
```

```
Performing system sanity check...
```

```
This command will cause a cold/disruptive reboot and will require that existing telnet, secure telnet
or SSH sessions be restarted.
```

```
Do you want to continue? [y/n]y
```

Example of firmware download with the **default-config** option:

```
device# firmware download default-config ftp directory /buildsjc/sre/SQA/slxos/17r.1.00/17r.1.00 host
10.31.2.27 user releaseuser password releaseuser
```

```
Performing system sanity check...
```

This command will cause a cold/disruptive reboot and will require that existing telnet, secure telnet or SSH sessions be restarted.

```
Do you want to continue? [y/n]y
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# firmware download fullinstall

Downloads the firmware on the local device.

## Syntax

```
firmware download { fullinstall | ftp | scp | sftp | tftp | usb } [ manual ] [ nocommit ] [ noreboot ] [ noactivate ] [ coldboot ] host
  { hostname | host_ip_address } user username password password directory directory [ file file_name ] [ use-vrf vrf-
  name ] ]
```

## Command Default

By default, **firmware download** downloads the firmware to the system, reboots the system, and commits the firmware automatically. The user can specify **noactivate** to download the firmware to the system without activating it (the node is not rebooted). You can run the **firmware activate** command later to activate the firmware.

## Parameters

### fullinstall

Downloads a larger file selection to cover the differences between 32-bit and 64-bit firmware when upgrading or downgrading the device.

### ftp | scp | sftp | usb

Valid protocols are **ftp** (File Transfer Protocol), **scp** (Secure Copy), **sftp** (SSH File Transfer Protocol), **tftp** (Trivial File Transfer Protocol), or **usb** (Universal Serial Bus). The values are not case-sensitive.

### manual

Updates a single management module in a chassis with two management modules. You must log in to the management module through its dedicated management IP address. This parameter is ignored when issued on a Top-of-Rack (ToR) device or in a chassis with only one management module.

### nocommit

Disables auto-commit mode. When auto-commit mode is disabled, firmware is downloaded only to the primary partition. You must execute the firmware **commit** command manually to propagate the new image to the secondary partition.

### noreboot

Disables auto-reboot mode. When auto-reboot mode is disabled, you must reboot the device manually.

### noactivate

Downloads the firmware to the system without activating it, so the device is not automatically rebooted. You can run the **firmware activate** command later to activate the firmware.

### host

Specifies the host by DNS name or IP address.

*hostname*

Specifies an IPv4 DNS host name.

*host\_ip\_address*

Specifies the host IP address. IPv4 and IPv6 addresses are supported.

**directory** *directory*

Specifies a fully qualified path to the directory where the firmware is located.

**file** *file\_name*

Specifies the firmware .plist file. This parameter is optional; if unspecified, the default file, release.plist, is used.

**user** *username*

Specifies the user login name for the host.

**password** *password*

Specifies the account password.

**use-vrf** *vrf-id*

Use this option to specify the name of the VRF where the host is located. If this option is not set, mgmt-vrf is used by default.

## Modes

Privileged EXEC mode

## Usage Guidelines

The **default-config** option causes the loss of configuration because it resets the configuration back to the default settings during the firmware upgrade process.

If the **firmware download** command is interrupted because of an unexpected reboot, such as a result of a software error or power failure, the command automatically recovers the corrupted secondary partition. Wait for the recovery to complete before beginning another firmware download.

The **fullinstall** option enables upgrading the firmware from a 32-bit version to a 64-bit version. Additionally, the **fullinstall** option enables downgrading the firmware from a 64-bit version to a 32-bit version. This feature assumes the device hardware is capable of supporting 64-bit architecture.

The **fullinstall** option preserves startup-config and licenses. However, though the startup-config is preserved, the system is designed to boot with the default-config. You must manually apply the configs that were preserved, if configurations are compatible. Manually copying the config file uses the **copy flash://startup-config running-config** command or the **copy <file> running-config** command.

## Examples

Example of firmware download with the **fullinstall** option:

```
device# firmware download fullinstall ftp user releaseuser password releaseuser file release.plist host
10.31.2.25 directory /buildsjc//sre_fusion/Nightly/pavo/nos_fusion_dev/nos_fusion_dev_fvt_170724_0932/
dist
Performing system sanity check...
```

You are running firmware download on dual MM system with 'fullinstall' option.

This command will preserve startup-config and license across Firmware download but will require manual re-play of configuration once after User verifies if configurations are compatible to the new image. Manual replay of configs could be achieved using 'copy flash://startup-config running-config' command or 'copy <file> running-config' command.

This command will cause a cold/disruptive reboot and will require that existing telnet, secure telnet or SSH sessions be restarted.

Do you want to continue? [y/n]:

## History

Release version	Command history
17r.1.01a	This command was introduced.

# firmware download ftp

Specifies FTP as the protocol used to perform a firmware download.

## Syntax

```
firmware download ftp [ coldboot ] [ manual ] [ noactivate ] [ nocommit ] [ noreboot ] host { hostname | host_ip_address }
use-vrf vrf-name user username password password directory directory [ file file_name ]
```

## Command Default

By default, downloads the firmware to the system, reboots the system, and commits the firmware automatically. The user can specify **noactivatefirmware download** to download the firmware to the system without activating it (the node is not rebooted). The user can run **firmware activate** later to activate the firmware.

## Parameters

### coldboot

Downloads the firmware to the system and reboots both the device.

### directory *directory*

Specifies a fully qualified path to the directory where the firmware is located.

### file *file\_name*

Specifies the firmware .plist file. This parameter is optional; if unspecified, the default file, release.plist, is used.

### host

Specifies the host by DNS name or IP address.

#### *hostname*

Specifies an IPv4 DNS host name.

#### *host\_ip\_address*

Specifies the host IP address. IPv4 and IPv6 addresses are supported.

### manual

Updates a single management module in a chassis with two management modules. You must log in to the management module through its dedicated management IP address. This parameter is ignored when issued on a compact device or in a chassis with only one management module.

### noactivate

Performs a firmware download without activation on the local device.

### nocommit

Disables auto-commit mode. When auto-commit mode is disabled, firmware is downloaded only to the primary partition. You must execute the firmware **commit** command manually to propagate the new image to the secondary partition.

### noreboot

Disables auto-reboot mode. When auto-reboot mode is disabled, you must reboot the device manually. If auto-commit mode was disabled, you must perform a manual firmware **commit** operation after the device comes back up.

- password** *password*  
Specifies the account password.
- use-vrf** *vrf-name*  
Specifies a VRF.
- user** *username*  
Specifies the user login name for the host.

## Modes

Privileged EXEC mode

## Usage Guidelines

Use this command to download firmware from an external host.

You can use one of the following options for firmware upgrade/downgrade; ISSU, coldboot, or default-config.

By default, if you enter the firmware download command without any options, the command invokes ISSU to upgrade the entire system. ISSU involves an High Availability failover of the active management module and is non-disruptive. In contrast, both of the coldboot and default-config options involve system reboots and are disruptive to traffic.

In addition, default-config causes the loss of configuration because it resets the configuration back to the default settings during the firmware upgrade process.

If the **firmware download** command is interrupted because of an unexpected reboot, such as a result of a software error or power failure, the command automatically recovers the corrupted secondary partition. Wait for the recovery to complete before beginning another firmware download.

This command does not support pagination.

## Examples

This example downloads firmware by means of FTP and specifies a path to the directory where the firmware is located. A user login name is specified for the host and an account password is specified.

```
device# firmware download ftp directory /buildsjc/sre/SQA/slxos/17r.1.00/17r.1.00 host 10.31.2.27 user
releaseuser password releaseuser
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# firmware download interactive

Allows the user to select firmware download parameters interactively before starting a firmware download.

## Syntax

```
firmware download interactive
```

## Command Default

By default, **firmware download** downloads the firmware to the system, reboots the system, and commits the firmware automatically.

## Modes

Privileged EXEC mode

## Usage Guidelines

Use this command to download firmware from an external host or from an attached USB device. You can run this command interactively or provide the parameters on the command line.

You can use one of the following options for firmware upgrade/downgrade; ISSU, coldboot, or default-config.

By default, if you enter the firmware download command without any options, the command invokes ISSU to upgrade the entire system. ISSU involves an High Availability failover of the active management module and is non-disruptive. In contrast, both of the coldboot and default-config options involve system reboots and are disruptive to traffic.

In addition, default-config causes the loss of configuration because it resets the configuration back to the default settings during the firmware upgrade process.

If the **firmware download** command is interrupted because of an unexpected reboot, such as a result of a software error or power failure, the command automatically recovers the corrupted secondary partition. Wait for the recovery to complete before beginning another firmware download.

This command does not support pagination.



## Examples

To perform a firmware download in interactive mode using default parameters:

```
device# firmware download interactive
Server name or IP address: 10.70.4.106
File name: dist
Protocol (ftp, scp, sftp, tftp) [ftp]: scp
User: fvt
Password: *****
Enter VRF name[mgmt-vrf]:
Select procedure (1=ISSU, 2=coldboot, 3=default-config) [1]:1
```

Performing system sanity check...

This command will cause a cold/disruptive reboot and will require that existing telnet, secure telnet or SSH sessions be restarted.

Do you want to continue? [y/n]y

## History

Release version	Command history
16r.1.00	This command was introduced.

# firmware download scp

Specifies Secure Copy (SCP) as the protocol used to perform a firmware download.

## Syntax

```
firmware download scp [ coldboot ] [ manual ] [ nocommit ] [ noreboot ] host { hostname | host_ip_address } user username
password password directory directory [ file file_name ] [ noactivate ] [ use-vrf vrf-name]
```

## Command Default

A filename is optional. If no filename is specified, release.plist, is used.

## Parameters

### coldboot

Downloads the firmware to the system and reboots the device.

### manual

Performs a firmware download on the local device.

### nocommit

Disables auto-commit mode. When auto-commit mode is disabled, firmware is downloaded only to the primary partition. You must execute the firmware **commit** command manually to propagate the new image to the secondary partition. (Skips auto-commit after firmware download.)

### noreboot

Disables auto-reboot mode. When auto-reboot mode is disabled, you must reboot the device manually. If auto-commit mode was disabled, you must perform a manual firmware **commit** operation after the device comes back up.

### host

Specifies the host by DNS name or IP address.

#### hostname

Specifies an IPv4 DNS host name.

#### host\_ip\_address

Specifies the host IP address. IPv4 and IPv6 addresses are supported.

### user username

Specifies the user login name for the host.

### password password

Specifies the account password.

### directory directory

Specifies a fully qualified path to the directory where the firmware is located.

### file file\_name

Specifies the firmware .plist file. This parameter is optional.

### noactivate

Performs a firmware download without activation on the local device.

**use-vrf** *vrf-id*

Use this option to specify the name of the VRF where the host is located. If this option is not set, mgmt-vrf is used by default.

## Modes

Privileged EXEC mode.

## Usage Guidelines

Use this command to download firmware from an external host or from an attached USB device. You can run this command interactively or provide the parameters on the command line.

You can use one of the following options for firmware upgrade/downgrade; ISSU, coldboot, or default-config.

By default, if you enter the firmware download command without any options, the command invokes ISSU to upgrade the entire system. ISSU involves an High Availability failover of the active management module and is non-disruptive. In contrast, both of the coldboot and default-config options involve system reboots and are disruptive to traffic.

In addition, default-config causes the loss of configuration because it resets the configuration back to the default settings during the firmware upgrade process.

If the **firmware download** command is interrupted because of an unexpected reboot, such as a result of a software error or power failure, the command automatically recovers the corrupted secondary partition. Wait for the recovery to complete before beginning another firmware download.

This command does not support pagination.

If the **firmware download** is interrupted because of an unexpected reboot as a result of a software error or power failure, the command automatically recovers the corrupted secondary partition. Wait for the recovery to complete before starting another firmware download.

## Examples

This example downloads firmware by means of SCP and specifies a path to the directory where the firmware is located. A user login name is specified for the host and an account password is specified.

```
device# firmware download scp directory /buildsjc/sre/SQA/nos/slxl7r.1.00/slxl7r.1.00 host 10.31.2.27
user releaseuser password releaseuser
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# firmware download sftp

Specifies Secure FTP (SFTP) as the protocol used to perform a firmware download.

## Syntax

```
firmware download sftp [ coldboot ] directory directory [ manual ] [ nocommit ] [ noreboot ] host { hostname |
host_ip_address } user username password password directory directory [ file file_name ] [ noactivate ] [ use-vrf vrf-
name ]
```

## Parameters

### **coldboot**

Downloads the firmware to the system and reboots both the device.

### **directory** *directory*

Specifies a fully qualified path to the directory where the firmware is located.

### **file** *filename*

Specifies the firmware .plist file. This parameter is optional; if unspecified, the default file, release.plist, is used.

### **host**

Specifies the host by DNS name or IP address.

#### *hostname*

Specifies an IPv4 DNS host name.

#### *host\_ip\_address*

Specifies the host IP address. IPv4 and IPv6 addresses are supported.

### **manual**

Performs a firmware download on the local switch.

### **noactivate**

Performs a firmware download without activation on the local switch.

### **nocommit**

Disables auto-commit mode. When auto-commit mode is disabled, firmware is downloaded only to the primary partition. You must execute the firmware **commit** command manually to propagate the new image to the secondary partition. (Skips auto-commit after firmware download.)

### **noreboot**

Disables auto-reboot mode. When auto-reboot mode is disabled, you must reboot the switch manually. If auto-commit mode was disabled, you must perform a manual firmware **commit** operation after the switch comes back up.

### **password** *password*

Specifies the account password.

### **user** *username*

Specifies the user login name for the host.

### **use-vrf** *vrf-id*

Use this option to specify the name of the VRF where the host is located. If this option is not set, mgmt-vrf is used by default.

## Modes

Privileged EXEC mode

## Usage Guidelines

Use this command to download firmware from an external host or from an attached USB device. You can run this command interactively or provide the parameters on the command line.

You can use one of the following options for firmware upgrade/downgrade; ISSU, coldboot, or default-config.

By default, if you enter the firmware download command without any options, the command invokes ISSU to upgrade the entire system. ISSU involves an High Availability failover of the active management module and is non-disruptive. In contrast, both of the coldboot and default-config options involve system reboots and are disruptive to traffic.

In addition, default-config causes the loss of configuration because it resets the configuration back to the default settings during the firmware upgrade process.

If the **firmware download** command is interrupted because of an unexpected reboot, such as a result of a software error or power failure, the command automatically recovers the corrupted secondary partition. Wait for the recovery to complete before beginning another firmware download.

This command does not support pagination.

If the **firmware download** is interrupted because of an unexpected reboot as a result of a software error or power failure, the command automatically recovers the corrupted secondary partition. Wait for the recovery to complete before starting another firmware download.

## Examples

This example downloads firmware by means of SFTP and specifies a path to the directory where the firmware is located. A user login name is specified for the host and an account password is specified.

```
switch# firmware download sftp directory /buildsjc/sre/SQA/sxlos/slx17r.1.00/slx17r.1.00 host
10.31.2.27 user releaseuser password releaseuser
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# firmware download tftp

Specifies Trivial FTP (TFTP) as the protocol used to perform a firmware download.

## Syntax

```
firmware download tftp [ coldboot ] directory directory [ manual ] [ nocommit ] [ noreboot ] host { hostname |
host_ip_address } user username password password directory directory [ file file_name ] [ noactivate ] [ use-vrf vrf-
name ]
```

## Parameters

### **coldboot**

Downloads the firmware to the system and reboots both the active and standby MMs.

### **directory** *directory*

Specifies a fully qualified path to the directory where the firmware is located.

### **file** *filename*

Specifies the firmware .plist file. This parameter is optional; if unspecified, the default file, release.plist, is used.

### **host**

Specifies the host by DNS name or IP address.

#### *hostname*

Specifies an IPv4 DNS host name.

#### *host\_ip\_address*

Specifies the host IP address. IPv4 and IPv6 addresses are supported.

### **manual**

Performs a firmware download on the local device.

### **noactivate**

Performs a firmware download without activation on the local device.

### **nocommit**

Disables auto-commit mode. When auto-commit mode is disabled, firmware is downloaded only to the primary partition. You must execute the firmware **commit** command manually to propagate the new image to the secondary partition. (Skips auto-commit after firmware download.)

### **noreboot**

Disables auto-reboot mode. When auto-reboot mode is disabled, you must reboot the device manually. If auto-commit mode was disabled, you must perform a manual firmware **commit** operation after the device comes back up.

### **password** *password*

Specifies the account password.

### **user** *username*

Specifies the user login name for the host.

### **use-vrf** *vrf-id*

Use this option to specify the name of the VRF where the host is located. If this option is not set, mgmt-vrf is used by default.

## Modes

Privileged EXEC mode

## Usage Guidelines

Use this command to download firmware from an external host or from an attached USB device. You can run this command interactively or provide the parameters on the command line.

You can use one of the following options for firmware upgrade/downgrade; ISSU, coldboot, or default-config.

By default, if you enter the firmware download command without any options, the command invokes ISSU to upgrade the entire system. ISSU involves an High Availability failover of the active management module and is non-disruptive. In contrast, both of the coldboot and default-config options involve system reboots and are disruptive to traffic.

In addition, default-config causes the loss of configuration because it resets the configuration back to the default settings during the firmware upgrade process.

If the **firmware download** command is interrupted because of an unexpected reboot, such as a result of a software error or power failure, the command automatically recovers the corrupted secondary partition. Wait for the recovery to complete before beginning another firmware download.

This command does not support pagination.

If the **firmware download** is interrupted because of an unexpected reboot as a result of a software error or power failure, the command automatically recovers the corrupted secondary partition. Wait for the recovery to complete before starting another firmware download.

## Examples

This example downloads firmware by means of TFTP and specifies a path to the directory where the firmware is located. The host is specified by IP address and a firmware .plist file is specified.

```
device# firmware download tftp directory /buildsjc/sre/SQA/slx/slx17r.1.00/slx17r.1.00 host 10.31.2.27
file release.plist
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# firmware download usb

Specifies USB as the protocol used to perform a firmware download.

## Syntax

```
firmware download usb [ coldboot ] [ noactivate ] [ nocommit ] [ noreboot ] [ manual ] directory directory
```

## Command Default

By default, the **firmware download** process reboots the system and activates the new image. Finally, the process performs a **firmware commit** operation to copy the new image to the other partition.

## Parameters

### coldboot

Downloads the firmware to the system and reboots both the active and standby MMs. **Caution:** Do not use this option unless instructed to do so by Extreme Technical Support.

### directory *directory*

Specifies a fully qualified path to the directory where the firmware is located.

### manual

Updates a single management module in a chassis with two management modules. You must log in to the management module through its dedicated management IP address. This parameter is ignored when issued on a Top-of-Rack (ToR) device or in a chassis with only one management module.

### noactivate

Performs a firmware download without activation on the local device.

### nocommit

Disables auto-commit mode. When auto-commit mode is disabled, firmware is downloaded only to the primary partition. You must execute the firmware **commit** command manually to propagate the new image to the secondary partition.

### noreboot

Disables auto-reboot mode. When auto-reboot mode is disabled, you must reboot the device manually. If auto-commit mode was disabled, you must perform a manual firmware **commit** operation after the device comes back up.

## Modes

Privileged EXEC mode

## Usage Guidelines

Use this command to download firmware from an external host or from an attached USB device. You can run this command interactively or provide the parameters on the command line.

You can use one of the following options for firmware upgrade/downgrade; ISSU, coldboot, or default-config.



By default, if you enter the firmware download command without any options, the command invokes ISSU to upgrade the entire system. ISSU involves an High Availability failover of the active management module and is non-disruptive. In contrast, both of the coldboot and default-config options involve system reboots and are disruptive to traffic.

In addition, default-config causes the loss of configuration because it resets the configuration back to the default settings during the firmware upgrade process.

If the **firmware download** command is interrupted because of an unexpected reboot, such as a result of a software error or power failure, the command automatically recovers the corrupted secondary partition. Wait for the recovery to complete before beginning another firmware download.

This command does not support pagination.

If the **firmware download** is interrupted because of an unexpected reboot as a result of a software error or power failure, the command automatically recovers the corrupted secondary partition. Wait for the recovery to complete before starting another firmware download.

## Examples

To download firmware from an attached USB device using the command line:

```
device# firmware download usb directory slx_17r.1.00
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# firmware recover

Recovers the previous firmware version on the device if a firmware upgrade was unsuccessful.

## Syntax

```
firmware recover
```

## Modes

Privileged EXEC mode

## Usage Guidelines

This command reverts the operation that was performed using the firmware download "noactivate" option.

If you invoke a noactivate firmware download, the firmware is loaded to the secondary node without swapping partitions. If firmware recover is executed, it performs a forceful commit.

This command does not reboot the node.

## Examples

To recover firmware on the device:

```
device# firmware recover
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# firmware restore

Swaps the partition and reboots the device.

## Syntax

`firmware restore`

## Modes

Privileged EXEC mode

## Usage Guidelines



### CAUTION

Do not use this command unless instructed by Extreme Technical Support.

Use this command to restore the previously active firmware image. You can run this command only if auto-commit mode was disabled during the firmware download. After a firmware download and a reboot (with auto-commit mode disabled), the downloaded firmware becomes active. If you do not want to commit the firmware, use the **firmware restore** command.

This command reboots the device and reactivates the previous firmware. After reboot, all primary and secondary partitions restore the previous firmware image.

This command causes the device to boot up with its older firmware. Later, the image in the primary partition is automatically committed to the secondary partition.

The **firmware download** command must have been run with the **nocommit** parameter for the **firmware restore** operation to succeed.

## Examples

To restore the previous firmware:

```
device# firmware restore

Restore old image to be active ...
Restore both primary and secondary image after reboot.
The system is going down for reboot NOW !!
Broadcast message from root (ttyS0) Fri Oct 26 23:48:54 2016...
Doing firmwarecommit now.
Please wait ...
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# flex-cli show link-fault-signaling

Displays information pertaining to link fault signaling (LFS).

## Syntax

```
flex-cli show link-fault-signaling
```

## Modes

Privileged EXEC mode

## Command Output

The `flex-cli show link-fault-signaling` command displays the following information:

Output field	Description
Port	Port number
Rx-Link-Fault	Displays rx link fault
Tx-Link-Fault	Displays tx link fault

## Examples

This example displays information pertaining to LFS.

```
device# flex-cli show link-fault-signaling
Port      Rx-Link-Fault  Tx-Link-Fault
0/1       ON             ON
0/2       ON             ON
0/3       ON             ON
0/4       ON             ON
0/5       ON             ON
0/6       ON             ON
0/7       ON             ON
0/8       ON             ON
0/9       ON             ON
0/10      ON             ON
0/11      ON             ON
0/12      ON             ON
0/13      ON             ON
0/14      ON             ON
0/15      ON             ON
0/16      ON             ON
0/17      ON             ON
0/18      ON             ON
0/19      ON             ON
0/20      ON             ON
0/21      ON             ON
0/22      ON             ON
```

## History

Release version	Command history
17r.1.01	This command was introduced.

# flex-cli show local-fault interface

Displays the local faults of an interface.

## Syntax

```
flex-cli show local-fault interface [ ethernet slot/port | port-channel port-channel-number ]
```

## Parameters

### ethernet

Specifies Ethernet interface.

### slot-number

Specifies the slot number.

### port-channel

Specifies port-channel.

### port-channel number

Specifies the port-channel number.

## Modes

Privileged EXEC mode

## Examples

This example displays the local faults of an interface.

```
device# flex-cli show local-fault interface ethernet 0/9
Port      Local-Fault-Detected      Local-Fault-Count      Time-Last-Local-Fault-Dete
ted
0/9       No                          0      N/A
dutC-Aval#
0/4       No                          0      N/A
0/5       No                          0      N/A
0/6       No                          0      N/A
0/7       No                          0      N/A
0/8       No                          0      N/A
0/9       No                          0      N/A
0/10      No                          0      N/A
0/11      No                          0      N/A
0/12      No                          0      N/A
0/13      No                          0      N/A
0/14      No                          0      N/A
0/15      No                          0      N/A
0/16      No                          0      N/A
0/17      No                          0      N/A
0/18      No                          0      N/A
0/19      No                          0      N/A
0/20      No                          0      N/A
0/21      No                          0      N/A
```

## History

Release version	Command history
17r.1.01	This command was introduced.

# flex-cli show local-fault slot

Displays the local faults of a slot.

## Syntax

`flex-cli show local-fault slot slot-number`

## Parameters

*slot-number*

Specifies the slot number.

## Modes

Privileged EXEC mode

## Examples

This example displays the local faults of a slot.

```
device# flex-cli show local-fault slot 1
Port      Local-Fault-Detected      Local-Fault-Count      Time-Last-Local-Fault-Deteted
0/1       No                          0                       0 N/A
0/2       No                          0                       0 N/A
0/3       No                          0                       0 N/A
```

## History

Release version	Command history
17r.1.01	This command was introduced.

# flex-cli show remote-fault interface

Displays the remote faults of an interface.

## Syntax

```
flex-cli show remote-fault interface [ ethernet slot/port | port-channel port-channel-number ]
```

## Parameters

### ethernet

Specifies Ethernet interface.

### *slot-number*

Specifies the slot number.

### port-channel

Specifies port-channel.

### *port-channel number*

Specifies the port-channel number.

## Modes

Privileged EXEC mode

## Examples

This example displays the remote faults of an interface.

```
device# flex-cli show remote-fault interface ethernet 0/10
Port      RFN-Detected      Remote-fault-count  Time-last-RFN-Detected
0/10      No                 0                   N/A
```

## History

Release version	Command history
17r.1.01	This command was introduced.



# flex-cli show remote-fault slot

Displays the remote faults of a slot.

## Syntax

`flex-cli show remote-fault slot slot-number`

## Parameters

*slot-number*

Specifies the slot number.

## Modes

Privileged EXEC mode

## Examples

This example displays the remote faults of a slot.

```
device# flex-cli show remote-fault slot 1
Port      RFN-Detected      Remote-fault-count  Time-last-RFN-Detected
0/1       No                 0                   N/A
0/2       No                 0                   N/A
0/3       No                 0                   N/A
0/4       No                 0                   N/A
0/5       No                 0                   N/A
0/6       No                 0                   N/A
0/7       No                 0                   N/A
0/8       No                 0                   N/A
0/9       No                 0                   N/A
0/10      No                 0                   N/A
0/11      No                 0                   N/A
0/12      No                 0                   N/A
0/13      No                 0                   N/A
0/14      No                 0                   N/A
0/15      No                 0                   N/A
0/16      No                 0                   N/A
0/17      No                 0                   N/A
0/18      No                 0                   N/A
0/19      No                 0                   N/A
0/20      No                 0                   N/A
0/21      No                 0                   N/A
0/22      No                 0                   N/A
```

## History

Release version	Command history
17r.1.01	This command was introduced.

# forward-delay

Specifies the time an interface spends in each of the listening and learning states.

## Syntax

**forward-delay** *seconds*  
**no forward-delay**

## Command Default

15 seconds

## Parameters

*seconds*

Specifies the time that an interface spends in the Spanning Tree Protocol (STP) learning and listening states. Valid values range from 4 through 30 seconds.

## Modes

Spanning tree configuration mode

## Usage Guidelines

This command specifies how long the listening and learning states last before the interface begins the forwarding of all spanning-tree instances.

STP interface states:

- Listening - The interface processes the Bridge Protocol Data Units (BPDUs) and awaits possible new information that might cause it to return to the blocking state.
- Learning - The interface does not yet forward frames (packets), instead it learns source addresses from frames received and adds them to the filtering database (switching database).
- Forwarding - An interface receiving and sending data, normal operation. STP still monitors incoming BPDUs that can indicate it should return to the blocking state to prevent a loop.
- Blocking - An interface that can cause a switching loop, no user data is sent or received, but it might go to the forwarding state if the other links in use fail and the STP determines that the interface may transition to the forwarding state. BPDU data continues to be received in the blocking state.

When you change the spanning-tree forward-delay time, it affects all spanning-tree instances. When configuring the forward-delay, the following relationship should be kept:

$$(2 \times (\text{forward-delay} - 1)) \geq \text{max-age} \geq (2 \times (\text{hello-time} + 1))$$

Enter **no forward-delay** to return to the default settings.

The command is the same regardless of which type of STP is enabled.

## Examples

To configure the forward-delay time to 18 seconds:

```
device# configure terminal
device(config)# protocol spanning-tree stp
device(conf-stp)# forward-delay 18
```

```
device# configure terminal
device(config)## protocol spanning-tree rstp
device(conf-rstp)# forward-delay 18
```

```
device# configure terminal
device(config)# protocol spanning-tree mstp
device(conf-mstp)# forward-delay 18
```

```
device# configure terminal
device(config)# protocol spanning-tree pvst
device(conf-pvst)# forward-delay 18
```

```
device# configure terminal
device(config)# protocol spanning-tree rpvst
device(conf-rpvst)# forward-delay 18
```

## History

Release version	Command history
16r.1.00	This command was introduced.

## from

Configures only the local interface of the routing device. The command penalizes any link on the specified interface, but not all links when the link is a multi-access link.

## Syntax

```
from { ip_addr }
no from { ip_addr }
```

## Command Default

The command is disabled, by default.

## Parameters

*ip\_addr*  
Specifies the selected IP address of the fate sharing group

## Modes

MPLS CSPF-group configuration mode (config-router-mpls-cspf-group-group\_name).

MPLS router MPLS interface dynamic bypass configuration mode (config-router-mpls-if-ethernet-slot/port-dynamic-bypass).

## Usage Guidelines

The order in which the local IP address to the remote IP address is configured is insignificant. For example, the configuration from 10.10.10.10 to 10.20.20.20 and from 10.20.20.20 to 10.10.10.10 has the same meaning.

The user can configure an interface level **from** IP address for a dynamic bypass LSP to be created for the protected MPLS interface. Dynamic bypasses use the **from** address as the IP address.

The **no** form of the command removes the from-address and is set to default.

## Examples

The following example configures the local address *10.1.1.1* of the fate sharing group.

```
device# configure
device(config)# router mpls
device(config-router-mpls)# cspf-group group3
device(config-router-mpls-cspf-group-group3)# from 10.1.1.1
```

The following example configures the **from** address *11.11.11.11* for dynamic bypass MPLS Ethernet interface *2/8*.

```
device# configure
device(config)# router mpls
device(config-router-mpls)# mpls-interface ethernet 2/8
device(config-router-mpls-if-ethernet-2/8)# dynamic-bypass
device(config-router-mpls-if-ethernet-2/8-dynamic-bypass)# from 11.11.11.11
```

## History

Release version	Command history
16r.1.00	This command was introduced.
17r.1.00	This command was modified to include MPLS dynamic bypass information.



# Commands G - J

---

## graceful-restart (BGP)

Enables the BGP graceful restart capability.

### Syntax

```
graceful-restart [ purge-time seconds | restart-time seconds | stale-routes-time seconds ]
```

```
no graceful-restart
```

### Command Default

Disabled.

### Parameters

#### purge-time

Specifies the maximum period of time, in seconds, for which a restarting device maintains stale routes in the BGP routing table before purging them. The default value is 600 seconds. The configurable range of values is from 1 to 3600 seconds.

#### restart-time

Specifies the restart-time, in seconds, advertised to graceful restart-capable neighbors. The default value is 120 seconds. The configurable range of values is from 1 to 3600 seconds.

#### stale-routes-time

Specifies the maximum period of time, in seconds, that a helper device will wait for an End-of-RIB (EOR) message from a peer. All stale paths are deleted when this time period expires. The default value is 360 seconds. The configurable range of values is from 1 to 3600 seconds.

### Modes

BGP address-family IPv4 unicast configuration mode

BGP address-family IPv6 unicast configuration mode

BGP address-family IPv4 unicast VRF configuration mode

BGP address-family IPv6 unicast VRF configuration mode

BGP address-family L2VPN EVPN configuration mode

## Usage Guidelines

Use this command under a BGP address-family configuration mode to enable or disable the graceful-restart capability for all BGP neighbors in the address family. When this command is enabled, graceful-restart capability is negotiated with neighbors in the BGP OPEN message when a session is established. If the neighbor advertises support for graceful restart, that function is activated for that neighbor session. Otherwise, graceful restart is not activated for that session, even though it is enabled locally. If the neighbor has not sent graceful-restart parameters, the restarting device will not wait for the neighbor to start route calculation, but graceful restart will be enabled.

If the graceful-restart capability is enabled after a BGP session has been established, the neighbor session must be cleared for graceful restart to take effect.

The **purge-time** parameter is applicable for both restarting and helper devices. The timer starts when a BGP connection is closed. The timer ends when an EOR is received from all nodes, downloaded into BGP and an EOR sent to all neighbors. The configured purge-time timer value is effective only on the configured node.

The **restart-time** parameter is applicable only for helper devices. The timer starts at the time the BGP connection is closed by the remote peer and ends when the Peer connection is established. The configured restart-time timer value is effective only on the peer node, and not in the configured node. During negotiation time, the timer value is exchanged.

The **stale-routes-time** parameter is applicable only for helper devices. The timer starts when the peer connection is established after the HA-failover. The timer ends at the time an EOR is received from the peer. The configured stale-time timer value is effective only on the configured node.

For non-default VRF instances, graceful restart timers are inherited from the default VRF. The **purge-time**, **restart-time**, and **stale-routes-time** parameters are not available in BGP address-family IPv4 unicast VRF configuration mode and BGP address-family IPv6 unicast VRF configuration mode.

Use the **clear ip bgp neighbor** command with the **all** parameter for the changes to the graceful-restart parameters to take effect immediately.

The **no** form of the command disables the BGP graceful-restart capability globally for all BGP neighbors in the address family.

## Examples

The following example enables the BGP graceful restart capability.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# local-as 1
device(config-bgp-router)# neighbor 1.1.1.1 remote-as 2
device(config-bgp-router)# address-family ipv4 unicast
device(config-bgp-ipv4u)# graceful-restart
```

The following example sets the purge time to 240 seconds.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# local-as 1
device(config-bgp-router)# neighbor 1.1.1.1 remote-as 2
device(config-bgp-router)# address-family ipv4 unicast
device(config-bgp-ipv4u)# graceful-restart
%Warning: Please clear the neighbor session for the parameter change to take effect!
device(config-bgp-ipv4u)# graceful-restart purge-time 240
```



The following example sets the restart time to 60 seconds.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# local-as 1
device(config-bgp-router)# neighbor 1.1.1.1 remote-as 2
device(config-bgp-router)# address-family ipv4 unicast
device(config-bgp-ipv4u)# graceful-restart
%Warning: Please clear the neighbor session for the parameter change to take effect!
device(config-bgp-ipv4u)# graceful-restart restart-time 60
%Warning: Please clear the neighbor session for the parameter change to take effect!
```

The following example sets the stale-routes time to 180 seconds.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# local-as 1
device(config-bgp-router)# neighbor 1000::1 remote-as 2
device(config-bgp-router)# address-family ipv6 unicast
device(config-bgp-ipv6u)# neighbor 1000::1 activate
device(config-bgp-ipv6u)# graceful-restart
%Warning: Please clear the neighbor session for the parameter change to take effect!
device(config-bgp-ipv6u)# graceful-restart stale-routes-time 180
%Warning: Please clear the neighbor session for the parameter change to take effect!
```

The following example enables the BGP graceful restart capability and sets the purge time to 220 seconds in L2VPN EVPN configuration mode.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family l2vpn evpn
device(config-bgp-evpn)# graceful-restart purge-time 220
```

## History

Release version	Command history
16r.1.00	This command was introduced.
17r.1.01	Support was added for the BGP address-family L2VPN EVPN configuration mode.

# graceful-restart (LDP)

Enables the MPLS LDP graceful restart capability for all LDP sessions and accesses the graceful restart (GR) configuration mode .

## Syntax

```
graceful-restart
no graceful-restart
```

## Command Default

Disabled.

## Modes

MPLS LDP configuration mode

## Usage Guidelines

When you enable LDP GR, the router waits until it receives an LDP Initialization message from its neighbor to know whether it must delete its states or start the LDP GR recovery procedure. It is applicable to all LDP sessions regardless of the adjacency type exists between the neighbors.

The **no** form of the command disables the LDP graceful-restart capability globally for all LDP sessions and removed the configuration.

## Examples

The following example enables the BGP graceful restart capability.

```
device# configure terminal
device(config)# router mpls
device(config-router-mpls)# ldp
device(config-router-mpls-ldp)# graceful-restart
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# graceful-restart (OSPFv2)

Enables the OSPF Graceful Restart (GR) capability.

## Syntax

```
graceful-restart [ helper-disable | restart-time seconds ]
no graceful-restart
```

## Command Default

Graceful restart and graceful restart helper capabilities are enabled.

## Parameters

### helper-disable

Disables the GR helper capability.

### restart-time

Specifies the maximum restart wait time, in seconds, advertised to neighbors. The default value is 120 seconds. The configurable range of values is from 10 through 1800 seconds.

## Modes

OSPF router configuration mode

OSPF router VRF configuration mode

## Usage Guidelines

Use **no graceful-restart helper-disable** to re-enable the GR helper capability.

The **no** form of the command disables the graceful restart capability.

## Examples

The following example disables the GR helper capability.

```
device# configure terminal
device(config)# router ospf
device(config-router-ospf-vrf-default-vrf)# graceful-restart helper-disable
```

The following example re-enables the GR helper capability.

```
device# configure terminal
device(config)# router ospf
device(config-router-ospf-vrf-default-vrf)# no graceful-restart helper-disable
```

The following example re-enables the GR capability and changes the maximum restart wait time from the default value to 240 seconds.

```
device# configure terminal
device(config)# router ospf
device(config-router-ospf-vrf-default-vrf)# graceful-restart restart-time 240
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# graceful-restart helper (OSPFv3)

Enables the OSPFv3 graceful restart (GR) helper capability.

## Syntax

```
graceful-restart helper { disable | strict-lsa-checking }
no graceful-restart helper
```

## Command Default

GR helper is enabled.

## Parameters

### disable

Disables the OSPFv3 GR helper capability.

### strict-lsa-checking

Enables the OSPFv3 GR helper mode with strict link-state advertisement (LSA) checking.

## Modes

OSPFv3 router configuration mode

OSPFv3 router VRF configuration mode

## Usage Guidelines

The **no** form of the command disables the GR helper capability on a device.

## Examples

The following example enables GR helper and sets strict LSA checking.

```
device# configure terminal
device(config)# ipv6 router ospf
device(config-ipv6-router-ospf-vrf-default-vrf)# graceful-restart helper strict-lsa-checking
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# graceful-restart helper-disable (IS-IS)

Disables and enables Intermediate System-to-Intermediate System (IS-IS) graceful restart (GR) helper mode.

## Syntax

```
graceful-restart helper-disable
no graceful-restart helper-disable
```

## Command Default

The GR helper is enabled by default.

## Modes

IS-IS router configuration mode

## Usage Guidelines

The **no** form of the command re-enables the GR helper if it has been disabled.

## Examples

The following example disables the IS-IS GR helper.

```
device# configure terminal
device(config)# router isis
device(config-isis-router)# graceful-restart helper-disable
```

The following example re-enables the IS-IS GR helper.

```
device# configure terminal
device(config)# router isis
device(config-isis-router)# no graceful-restart helper-disable
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ha chassisreboot

Performs a reboot of the chassis.

## Syntax

```
ha chassisreboot
```

## Modes

Privileged EXEC mode

## Usage Guidelines

This command reboots the entire chassis. Both the active and the standby management module reboot. Both management modules retain their original high-availability (HA) role after the system comes back up. If the power-on self test (POST) is enabled, it is executed when the system comes back up.

This command is supported only on the active management module. This command is not supported on the standby management module. Both management modules must be in sync for the HA reboot operation to succeed. Failover and reboots can be disruptive.

## Examples

To perform an HA reboot:

```
device# ha chassisreboot
```

## History

Release version	Command history
16r.1.01	This command was introduced.

# ha disable

Disables the High Availability (HA) feature on a device.

## Syntax

```
ha disable
```

## Command Default

HA is disabled.

## Modes

Privileged EXEC mode

## Usage Guidelines

If the HA feature is already disabled, this command has no effect.

This command is supported only on the active management module.

This command is not supported on the standby management module.

Do not use this command unless instructed by Extreme Technical Support.

## Examples

To disable HA on a device:

```
device# ha disable
```

## History

Release version	Command history
16r.1.01	This command was introduced.



# ha enable

Enables the High Availability (HA) feature on a device.

## Syntax

```
ha enable
```

## Command Default

HA is disabled.

## Modes

Privileged EXEC mode

## Usage Guidelines

If the HA feature is already enabled, this command has no effect. If the HA feature is disabled, this command enables it. The standby management process reboots as part of the process.

Running the command displays a warning message and prompts for confirmation before rebooting the management module.

You can also use this command to display the servers that are running the syslogd daemon and those that system messages are sent to. Servers are specified in the configuration database by IP address.

This command is supported only on the local management module.

This command is not supported on the standby management module.

Do not use this command unless instructed by Extreme Technical Support.

## Examples

To enable HA on a device:

```
device# ha enable
```

## History

Release version	Command history
16r.1.01	This command was introduced.

# ha failover

Initiates a failover from the active to the standby management module (MM).

## Syntax

```
ha failover
```

## Modes

Privileged EXEC mode

## Usage Guidelines

This command forces a failover from the active to the standby MM. When the process completes, the former standby performs a warm recovery and takes over as the active MM. If the active and standby MMs are not synchronized, the command aborts.

## Examples

To perform a failover:

```
device# ha failover
```

## History

Release version	Command history
16r.1.01	This command was introduced.

# ha sync start

This command is used to enable the high availability (HA) state synchronization.

## Syntax

```
ha sync start
```

## Modes

Privileged EXEC mode

## Examples

To enable HA synchronization:

```
device# ha sync start
```

## History

Release version	Command history
16r.1.01	This command was introduced.

# ha sync stop

Disables high availability state synchronization on a device.

## Syntax

**ha sync stop**

## Command Default

Synchronization is enabled.

## Modes

Privileged EXEC mode

## Examples

To disable state synchronization:

```
device# ha sync stop
```

## History

Release version	Command history
16r.1.01	This command was introduced.

# handle-isis-neighbor-down

Globally enables the handling of an IGP neighbor down event by MPLS. This command can be executed on the fly and takes effect immediately. It makes it possible to enable handling of neighbor down events for IS-IS.

## Syntax

```
handle-isis-neighbor-down
```

```
no handle-isis-neighbor-down
```

## Command Default

By default, RSVP does not handle IGP neighbor down events. RSVP IGP synchronization must be enabled to handle an IGP neighbor down event.

## Modes

MPLS policy mode (config-router-mpls-policy).

## Usage Guidelines

### Limitations

1. The **handle-isis-neighbor-down** command is independent of MPLS traffic engineering configurations. The **handle-isis-neighbor-down** command allows MPLS (RSVP) to handle IGP neighbor down events and take action, such as tearing down the associated RSVP sessions. For example, when IS-IS is configured as MPLS TE protocol, the user can still configure MPLS to handle an OSPF neighbor down event (and vice versa).
2. An IGP neighbor down event is handled only by the RSVP sub-component of MPLS by tearing down the associated sessions. This event is not handled by LDP sub-component of MPLS.
3. MPLS RSVP does not keep track of the current state of IGP neighbor. That is, when an IGP neighbor goes down, RSVP tears down all the associated sessions. But RSVP does not prevent bringing up any session while the IGP neighbor to RSVP next-hop is down (or not yet available). That is, the RSVP session is brought up even when the IGP neighbor to the next-hop does not exist.
4. An IGP neighbor down is treated as upstream neighbor down or downstream neighbor down event by RSVP, depending upon the direction of the LSP. When a downstream IGP neighbor goes down, it results in an LSP tear down or FRR switchover, whichever is applicable.
5. MPLS receives and processes an IGP neighbor down event only for the cases when an IGP neighbor goes down because of hellos not received from the peer.
6. When an IGP neighbor goes down because of an underlying interface down, MPLS does not react to an IGP neighbor down event as RSVP would also receive the interface down event and tears down associated LSP sessions. Handling an IGP neighbor down event is redundant in such situations.
7. When BFD is configured on IGP interfaces, an IGP neighbor down is detected quickly and may help RSVP converge faster.

8. When an IGP neighbor is Nonstop Routing or Graceful Restart (NSR/GR) capable, MPLS does not receive a neighbor down event when NSR is performed on the peer IGP router.
9. Faster FRR feature is not be triggered when MPLS detects that IGP neighbor is down. Instead, each FRR LSP is processed individually to perform local repair.
10. It is highly recommended to observe extreme caution when implementing this feature when BFD is enabled for the underlying IGP. Under some circumstances, unnecessary flapping for RSVP sessions/LSPs can occur with this combination.

The **no** version of the command does not handle IGP neighbor down events.

## Examples

The following example shows how to enable the RSVP to handle IGP neighbor down events for IS-IS.

```
device# configure
device(config)# router mpls
device(config-router-mpls)# policy
device(config-router-mpls-policy)# handle-isis-neighbor-down
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# hardware

Accesses hardware configuration mode to access the connector, port-group, and profile configuration modes.

## Syntax

**hardware**

## Modes

Global configuration mode

## Examples

The following example shows the accessing of hardware configuration mode.

```
device# configure terminal
device(config)# hardware
device(config-hardware)#
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# hello (LLDP)

Sets the interval between LLDP hello messages.

## Syntax

```
hello seconds
no hello
```

## Command Default

30 seconds

## Parameters

*seconds*  
Valid values range from 4 through 180 seconds.

## Modes

LLDP protocol and profile configuration modes

## Usage Guidelines

The LLDP hello messages can also be configured for a specific LLDP profile. When you apply an LLDP profile on an interface using the **lldp profile** command, it overrides the global configuration. If a profile is not present, then the default global profile is used until you create a valid profile.

Enter **no hello** to return to the default setting.

## Examples

To set the time interval to 10 seconds between the transmissions:

```
device# configure terminal
device (config)# protocol lldp
device(conf-lldp)# hello ?
Possible completions:
<4-180>   Seconds[30 seconds]
device(conf-lldp)# hello 10
```

To set the time interval to 8 seconds between the transmissions for a specific LLDP profile:

```
device(conf-lldp)# profile test1
device(config-profile-test1)# hello 8
device(config-profile-test1)#
```



## History

Release version	Command history
16r. 1.00	This command was introduced.

# hello (MPLS RSVP)

Enables RSVP Hello on all RSVP interfaces and configure the interval and tolerance.

## Syntax

```
hello [ interval seconds ] [tolerance number]  
no hello [ interval ] [tolerance ]
```

## Command Default

RSVP Hello is disabled on the device.

The default interval is 9 seconds.

The default tolerance is 3 unacknowledged RSVP Hello requests before timeout.

## Parameters

**interval** *seconds*

Specifies the interval in seconds between two RSVP Hello requests. Enter an integer from 1 to 60.

**tolerance** *number*

Specifies the number of unacknowledged RSVP Hello requests before timeout. Enter a number from 1 to 255.

## Modes

MPLS RSVP configuration mode

MPLS interface RSVP configuration mode

## Usage Guidelines

When you configure the interval and tolerance for the RSVP-TE Hello protocol globally, they are pushed to all MPLS interfaces when MPLS interface configurations are not present. In addition to these two parameters, you can configure the acknowledgments globally.

You can configure RSVP-TE Hello interval and tolerance on an MPLS interface. The interface configurations take precedence over global configurations.

By default, acknowledgments are not sent on the MPLS interface supporting RSVP Hello when no sessions are taken on the interface.



### CAUTION

**When disabling RSVP hello, disable it on both sides of the link at the same time to avoid bringing down all the RSVP sessions going over that link.**

Use the **no** command to disable RSVP Hello, or to reset the default interval or tolerance settings.

The **no hello** command on the MPLS interface sets the RSVP-TE Hello parameters to the globally configured RSVP Hello parameter values. If RSVP Hello is not configured globally, it disables the RSVP Hello on the MPLS interface. Executing this removes the configuration from the interface.

## Examples

The following example enables RSVP hello globally and configures the interval at 15 seconds and a tolerance of 8.

```
device# configure terminal
device(config)# router mpls
device(config-router-mpls)# rsvp
device(config-router-mpls-rsvp)# hello interval 15 tolerance 8
```

The following example enables RSVP hello on an MPLS interface and configures the interval at 20 seconds and a tolerance of 10.

```
device(config)# router mpls
device(config-router-mpls)# mpls-interface ethernet 1/12
device(config-router-mpls-interface-1/12)# rsvp
device(config-router-mpls-interface-1/12-rsvp)# hello interval 20 tolerance 10
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# hello (UDLD)

Sets the hello transmit interval.

## Syntax

**hello** *hundred\_milliseconds*

**no hello**

## Command Default

5 is the default value (500 milliseconds).

## Parameters

*hundred\_milliseconds*

Valid values range from 1 through 60 (in counts of 100 milliseconds).

## Modes

Unidirectional link detection (UDLD) protocol configuration mode

## Usage Guidelines

Use this command to set the time interval between the transmission of hello UDLD PDUs from UDLD-enabled ports.

Enter **no hello** to return to the default setting.

## Examples

To set the time interval to 2,000 milliseconds between hello UDLD PDU transmissions:

```
device# configure terminal
device(config)# protocol udld
device(config-udld)# hello 20
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# hello padding

Re-enables the padding of Intermediate System-to-Intermediate System (IS-IS) hello Protocol Data Units (PDUs) globally.

## Syntax

```
hello padding [ disable ] [ point-to-point ]  
no hello padding [ disable ] [ point-to-point ]
```

## Command Default

Enabled.

## Parameters

**disable**  
Disables the padding of IS-IS hello PDUs.

**point-to-point**  
Specifies point-to-point interfaces.

## Modes

IS-IS router configuration mode

## Usage Guidelines

Generally, you do not need to disable padding unless a link is experiencing slow performance. If you enable or disable padding on an interface using the **isis hello padding** command, the interface setting overrides the global setting.

The **no** form of the command disables the padding of IS-IS hello PDUs.

## Examples

The following example globally disables padding of IS-IS hello PDUs.

```
device# configure terminal  
device(config)# router isis  
device(config-isis-router)# hello padding disable
```

The following example globally disables padding of IS-IS hello PDUs for point-to-point interfaces.

```
device# configure terminal  
device(config)# router isis  
device(config-isis-router)# hello padding disable point-to-point
```

The following example globally re-enables padding of IS-IS hello PDUs.

```
device# configure terminal  
device(config)# router isis  
device(config-isis-router)# hello padding
```

hello padding

The following example globally re-enables padding of IS-IS hello PDUs for Point-to-Point interfaces.

```
device# configure terminal
device(config)# router isis
device(config-isis-router)# hello padding point-to-point
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# hello-acknowledgements

Configures the MPLS RSVP-TE Hello to respond back with Hello ACKs to neighbors not carrying any RSVP sessions.

## Syntax

```
hello-acknowledgements
no hello-acknowledgements
```

## Command Default

By default, RSVP Hello acknowledgements are disabled.

## Modes

MPLS RSVP configuration mode

## Usage Guidelines

Use the **no** form of this command to reset the default behavior.

## Examples

The following example enables RSVP Hello acknowledgements.

```
device# configure terminal
device(config)# router mpls
device(config-router-mpls)# rsvp
device(config-router-mpls-rsvp)# hello-acknowledgements
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# hello-interval

Configures a global hello interval for the loop-detection (LD) protocol.

## Syntax

```
hello-interval milliseconds ]
no hello-interval
```

## Command Default

See the Usage Guidelines.

## Parameters

*milliseconds*

Range is from 100 through 5000 milliseconds. The default is 1000 milliseconds.

## Modes

Protocol Loop Detection configuration mode.

## Usage Guidelines

Use the **no** form of this command to revert to the default hello interval.

## Examples

To configure a hello interval of 2000 milliseconds:

```
device# configure terminal
device(config)# protocol loop-detection
device(config-loop-detect)# hello-interval 2000
```

To revert to the default hello interval:

```
device# configure terminal
device(config)# protocol loop-detection
device(config-loop-detect)# no hello-interval
```

## History

Release version	Command history
17r.1.00	This command was introduced.



# hello-interval (LDP)

Sets the interval between LDP Hello messages for LDP sessions for LDP interfaces. These messages maintain LDP sessions between the device and its LDP peers.

## Syntax

```
hello-interval interval
no hello-interval interval
```

## Command Default

For an LDP interface configuration, the default value is the interval for the configured global LDP Hello messages.

## Parameters

*interval*  
Specifies the interval in seconds. Enter an integer from 1 through 32767.

## Modes

MPLS interface LDP configuration mode

## Usage Guidelines

Use this command to set the interval for LDP Link Hello messages that are multicast to all routers on the subnet.

When you configure the LDP link interval for an interface, it overrides the global interval.

When a Hello Adjacency already exists, the adjacency remains up and any new configured interval takes effect upon the expiration of the current Hello Interval timer. Consequently, the next and subsequent Hello messages are sent at the new interval.

Use the **no** for this command to reset the default interval.

## Examples

The following example sets the link Hello message interval for the interface to 30 seconds.

```
device# configure terminal
device(config)# router mpls
device(config-router-mpls)# mpls-interface ethernet 1/2
device(config-router-mpls-interface-1/2)# ldp-params
device(config-router-mpls-interface-1/2-ldp-params)# hello-interval 30
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# hello-interval (PIM)

Sets the frequency with which the device sends PIM hello messages to its neighbors.

## Syntax

**hello-interval** *seconds*

**no hello-interval**

## Command Default

The default is 30 seconds.

## Parameters

*seconds*

Specifies the hello interval value in seconds. The range is 10 to 3600 seconds.

## Modes

PIM Router configuration mode

## Examples

The following example sets the PIM hello interval.

```
device(config)# router pim
device(config-pim-router)# hello-interval 50
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# hello-interval-link

Sets the interval between LDP link Hello messages globally which applies to all LDP interfaces. These messages are used to maintain LDP sessions between the device and its LDP peers.

## Syntax

**hello-interval-link** *interval*

**no hello-interval-link**

## Command Default

The default is 5 seconds.

## Parameters

*interval*

Specifies the interval in seconds. Enter an integer from 1 through 32767.

## Modes

MPLS LDP configuration mode

## Usage Guidelines

Use this command to globally set the interval for LDP Link Hello messages that multicast to all routers on the subnet.

When you configure the LDP link interval for an interface, it overrides the global interval for the interface.

When a Hello Adjacency already exists, the adjacency remains up and any new configured interval takes effect upon the expiration of the current Hello Interval timer. Consequently, the next and subsequent hello messages are sent at the new interval.

Use the **no** for this command to reset the default interval.

## Examples

The following example sets the global interval to 10 seconds.

```
device# configure terminal
device(config)# router mpls
device(config-router-mpls)# ldp
device(config-router-mpls-ldp)# hello-interval-link 10
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# hello-interval-target

Sets the interval between LDP Targeted Hello messages globally for all LDP interfaces. These messages are used to maintain LDP sessions between the device and its LDP peers.

## Syntax

**hello-interval-target** *interval*

**no hello-interval-target**

## Command Default

The default is 15 seconds.

## Parameters

*interval*

Specifies the interval in seconds. Enter an integer from 1 through 32767.

## Modes

MPLS LDP configuration mode

## Usage Guidelines

Use this command to set the interval for LDP Targeted Hello messages that are unicast to a specific address, such as a VLL peer.

For targeted LDP sessions, the LDP Hello Interval can only be set globally.

Use the **no** for this command to reset the default interval.

## Examples

The following example sets the interval for LDP Targeted Hello messages to 10 seconds.

```
device# configure terminal
device(config)# router mpls
device(config-router-mpls)# ldp
device(config-router-mpls-ldp)# hello-interval-target 10
```

## History

Release version	Command history
16r. 1.00	This command was introduced.

# hello-time

Sets the interval between the hello Bridge Protocol Data Units (BPDUs) sent on an interface.

## Syntax

**hello-time** *seconds*

**no hello-time**

## Command Default

2 seconds

## Parameters

*seconds*

Specifies the time interval between the hello BPDUs sent on an interface. Valid values range from 1 through 10 seconds.

## Modes

Spanning tree configuration mode

## Usage Guidelines

This command configures the spanning-tree bridge hello time, which determines how often the device broadcasts hello messages to other devices.

If the VLAN parameter is not provided, the **hello-time** value is applied globally for all per-VLAN instances. But for the VLANs which have been configured explicitly, the per-VLAN configuration takes precedence over the global configuration. When configuring the **hello-time**, the **max-age** command setting must be greater than the **hello-time** setting. The following relationship should be kept:

$$(2 \times (\text{forward-delay} - 1)) \geq \text{max-age} \geq (2 \times (\text{hello-time} + 1))$$

Enter **no hello-time** to return to the default settings.

The command is the same regardless of which type of STP is enabled.

## Examples

To configure spanning tree bridge hello time to 5 seconds:

```
device# configure terminal
device(config)# protocol spanning-tree stp
device(conf-stp)# hello-time 5
```

```
device# configure terminal
device(config)# protocol spanning-tree rstp
device(conf-rstp)# hello-time 5
```

```
device# configure terminal
device(config)# protocol spanning-tree mstp
device(conf-mstp)# hello-time 5
```

```
device# configure terminal
device(config)# protocol spanning-tree pvst
device(conf-pvst)# hello-time 5
```

```
device# configure terminal
device(config)# protocol spanning-tree rpvt
device(conf-rpvst)# hello-time 5
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# hello-timeout (LDP)

Sets how long the device waits for its LDP peers for LDP sessions to send a Hello message for LDP interfaces.

## Syntax

`hello-timeout` *seconds*

`no hello-timeout` *seconds*

## Command Default

For an LDP interface configuration, the default value is the hold time for the configured global LDP Hello messages.

## Parameters

*seconds*

Specifies the hold time in seconds. Enter an integer from 2 through 65335. The minimum value that can be configured for the hold time is two times the value set for the Hello interval.

## Modes

MPLS interface LDP configuration mode

## Usage Guidelines

When the device does not receive a Hello message within this time, the LDP session with the peer can be terminated. The device includes the hold time in the Hello messages it sends out to its LDP peers.

The new time takes effect immediately and goes in the next Hello message sent. This hold time applies to only the hold time that the device sends to its peers. It does not affect the hold time the device uses to time out those peers. The latter is determined from the hold time that peers send to the device.

Use the **no** for this command to reset the default interval.

## Examples

The following example sets the link Hello hold time for the interface to 30 seconds.

```
device# configure terminal
device(config)# router mpls
device(config-router-mpls)# mpls-interface ethernet 1/2
device(config-router-mpls-interface-1/2)# ldp-params
device(config-router-mpls-interface-1/2-ldp-params)# hello-timeout 30
```

## History

Release version	Command history
16r. 1.00	This command was introduced.

# hello-timeout-link

Sets how long the device waits for its LDP peers for link LDP sessions to send a Hello message.

## Syntax

```
hello-timeout-link seconds
no hello-timeout-link
```

## Command Default

The default is 15 seconds.

## Parameters

*seconds*

Specifies the hold time in seconds. Enter an integer from 2 through 65335.

## Modes

MPLS LDP configuration mode

## Usage Guidelines

When the device does not receive a Hello message within this time, the LDP session with the peer can be terminated. The device includes the hold time in the Hello messages it sends out to its LDP peers.

The new time takes effect immediately and goes in the next Hello message sent. This hold time applies to only the hold time that the device sends to its peers. It does not affect the hold time the device uses to time out those peers. The latter is determined from the hold time that peers send to the device.

Use the **no** for this command to reset the default hold time.

## Examples

The following example sets the global hold time to 10 seconds.

```
device# configure terminal
device(config)# router mpls
device(config-router-mpls)# ldp
device(config-router-mpls-ldp)# hello-timeout-link 10
```

## History

Release version	Command history
16r. 1.00	This command was introduced.



# hello-timeout-target

Sets how long the device waits for its LDP peers for targeted LDP sessions to send a Hello message.

## Syntax

```
hello-timeout-target seconds
no hello-timeout-target
```

## Command Default

The default is 45 seconds.

## Parameters

*seconds*

Specifies the hold time in seconds. Enter an integer from 2 through 65335.

## Modes

MPLS LDP configuration mode

## Usage Guidelines

When the device does not receive a Hello message within this time, the LDP session with the peer can be terminated. The device includes the hold time in the Hello messages it sends out to its LDP peers.

The new time takes effect immediately and goes in the next Hello message sent. This hold time applies to only the hold time that the device sends to its peers. It does not affect the hold time the device uses to time out those peers. The latter is determined from the hold time that peers send to the device.

Use the **no** for this command to reset the default timeout.

## Examples

The following example sets the global hold time to 10 seconds.

```
device# configure terminal
device(config)# router mpls
device(config-router-mpls)# ldp
device(config-router-mpls-ldp)# hello-timeout-target 10
```

## History

Release version	Command history
16r. 1.00	This command was introduced.

# helper-only

Specifies that the LSR acts as a helper only for LDP graceful restart.

## Syntax

**helper-only**

**no helper-only**

## Command Default

Full LDP GR mode with the router acting either as a restarting router or a GR helper.

## Modes

MPLS LDP GR configuration mode

## Usage Guidelines

A GR helper is an LSR whose neighbor is restarting its LDP component.

In helper mode, a router does not preserve its forwarding entries on a LDP GR restart. It indicates to its peers that forwarding state is not preserved by sending an initialization message with the Reconnect Time and the Recovery Time set to zero (0) in FT session TLV. The configuration commands for reconnect-time and recovery-time are rejected with informational messages. However, it can help a neighboring router recover its forwarding entries when the neighbor is going through restart.

The **no** form of the command removes the LDP GR helper mode and revert back to full LDP GR mode with the router acting either as a restarting router or a GR helper.

## Examples

The following example configures the LSR for LDP GR helper mode only.

```
device# configure terminal
device(config)# router mpls
device(config-router-mpls)# ldp
device(config-router-mpls-ldp)# graceful-restart
device(config-router-mpls-ldp-gr)# helper-only
```

## History

Release version	Command history
16r. 1.00	This command was introduced.

# hold-time

Sets the time that a previously down backup VRRP router, which also must have a higher priority than the current master VRRP router, will wait before assuming mastership of the virtual router.

## Syntax

`hold-time range`

## Command Default

0 seconds

## Parameters

*range*

A value between 1 and 3600 seconds that specifies the time a formerly down backup router waits before assuming mastership of the virtual router.

## Modes

Virtual-router-group configuration mode

## Usage Guidelines

The hold-time must be set to a number greater than the default of 0 seconds for this command to take effect.

This command can be used for both VRRP and VRRP-E.

## Examples

To set the hold time to 60 seconds for backup routers in a specific virtual router:

```
device# configure terminal
device(config)# interface ve 25
device(config-ve-25)# vrrp-extended-group 1
device(config-vrrp-extended-group-1)# hold-time 60
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# hop-limit

Gives the ability to change the hop limit to a lower number.

## Syntax

```
hop-limit { number }
```

```
hop-limit { number }
```

## Command Default

By default, there is no hop-limit configuration .

## Parameters

*number*

Specifies the selected number of hops in the path. The range for the number of hops is 0 - 255 with a default number of 255.

## Modes

MPLS LSP configuration mode (*config-router-mpls-lsp-lsp\_name*).

MPLS router bypass LSP configuration mode (*config-router-mpls-bypass-lsp-bypass\_name*).

MPLS router MPLS interface dynamic bypass configuration mode (*config-router-mpls-if-ethernet-slot/port-dynamic-bypass*)

## Usage Guidelines

The **no** form of the command removes the specified number of hops and returns to the default hop number of 255 hops.

The user can configure an interface level hop-limit for dynamic Bypass LSPs to be created corresponding to a protected link.

Compute the dynamic bypass path, so the hop-limit is the minimum number of the backup requested hop limit and the interface mode configured hop limit. This computed hop limit sets as the dynamic bypass LSP hop limit during the initial creation of dynamic bypass.

## Examples

The following example limits the CSPF to choosing a path consisting of no more than 20 hops for LSP *tunnel1* .

```
device# configure
device(config)# router mpls
device(config-router-mpls)# lsp tunnel1
device(config-router-mpls-lsp-tunnel1)# hop-limit 20
```

The following example configures the bypass LSP hop limit to 6.

```
device# configure
device(config)# router mpls
device(config-router-mpls)# bypass-lsp my-bypass-lsp
device(config-router-mpls-bypass-lsp-my-bypass-lsp)# hop-limit 6
```

The following example configures dynamic bypass MPLS Ethernet interface 2/8 s hop-limit to 5 .

```
device# configure
device(config)# router mpls
device(config-router-mpls)# mpls-interface ethernet 2/8
device(config-router-mpls-if-ethernet-2/8)# dynamic bypass
device(config-router-mpls-if-ethernet-2/8-dynamic-bypass)# hop-limit 5
```

## History

Release version	Command history
16r.1.00	This command was introduced.
17r.1.00	This command was modifies to include MPLS bypass LSP information.

# hostname disable

Disables Intermediate System-to-Intermediate System (IS-IS) name mapping on a device.

## Syntax

**hostname disable**

**no hostname disable**

## Command Default

Disabled.

## Modes

IS-IS router configuration mode

## Usage Guidelines

The implementation of IS-IS supports RFC 2763, which describes a mechanism for mapping IS-IS system IDs to the host names of the devices with those IDs. For example, if you set the host name on the device to "IS-IS Router 1", the mapping capability uses this name instead of the IS-IS system ID of the device in the output of the following commands:

- show isis database
- show isis interface
- show isis neighbor

The **no** form of the command re-enables IS-IS name mapping on a device.

## Examples

The following example disables IS-IS name mapping.

```
device# configure terminal
device(config)# router isis
device(config-isis-router)# hostname disable
```

The following example re-enables IS-IS name mapping.

```
device# configure terminal
device(config)# router isis
device(config-isis-router)# no hostname disable
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# image-snapshot create

Creates a snapshot image of the current running image and configuration and saves it to a partition.

## Syntax

```
image-snapshot create
```

## Command Default

A default snapshot image is installed.

## Modes

Privileged EXEC mode

## Usage Guidelines

This command updates the current running image and configuration to the snapshot partition. Additionally, it copies the current working HOST and VM images to the snapshot partition. This is an irreversible process.

This is part of the Open Network Install Environment (ONIE) recover procedure for the SLX 9540. Refer to the *Extreme SLX-OS Software Upgrade Guide*.

## Examples

Typical command execution on a device.

```
device# image-snapshot create
Image Snapshot: Checking snapshot partition .... OK
Image Snapshot: Taking Snapshot of VM Images ..... Success
Image Snapshot: Taking snapshot of Host Images ..... Success
Image Snapshot: Checking for Standby ..... OK
Image Snapshot: Checking snapshot partition .... OK
Image Snapshot: updating Snapshot images to standby Host.... Success
Image Snapshot: Completed, Version 16r.1.01d, Date: Tue Nov 22 22:30:21 PST 2016
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# implicit-commit

MPLS allows the user to modify the configurable parameters for RSVP LSPs while the LSP is operational.

## Syntax

```
implicit-commit { all | lsp-reoptimize-timer }
no implicit-commit
```

## Command Default

There is no implicit commit, by default.

## Parameters

**all**  
Enables an implicit commit for all triggers.

**lsp-reoptimize-timer**  
Enables an implicit commit for reoptimizations.

## Modes

MPLS policy configuration mode (config-router-mpls-policy)

## Usage Guidelines

The **no** form of the command removes the implicit commit.

After modifying the parameters for an operational LSP, the user must execute the **commit** command to apply the changes. Applying these configuration changes requires a new instance of the LSP to be signaled with a modified or new set of parameters, also known as make-before-break. Once the new instance of the LSP is up, the old instance is removed.

By default, if the adaptive parameters of an LSP have changed, but the changes are not yet committed, any system-initiated make-before-break, such as an LSP re-optimization event, is ignored. To allow changes to be automatically applied, the user can use the **implicit-commit lsp-reoptimize-timer** command under the router MPLS policy command to enable certain types of events to trigger implicit commit.

## Examples

The following example enable the LSP re-optimize timer to trigger an implicit commit.

```
device# configure
device(config)# router mpls
device(config-router-mpls)# policy
device(config-router-mpls-policy)# implicit-commit lsp-reoptimize-timer
```



## History

Release version	Command history
16r.1.00	This command was introduced.

# import-map

Imports the target-VPN community.

## Syntax

```
import-map route-map
```

```
no import-map route-map
```

## Parameters

*route-map*

Specifies the route-map name .

## Modes

VRF configuration mode

## Usage Guidelines

The **no** form of the command to apply a route-map filter on the routes to be imported.

## Examples

The following example shows how to import target-VPN community.

```
device# configure terminal
device(config)# vrf vpn1
device(config-vrf-vpn1)# rd 1:2
device(config-vrf-vpn1)# vpn-statistics
device(config-vrf-vpn1)# address-family ipv4 unicast
device(config-vrf-vpn1-ipv4-unicast)# route-target-import 100:1
device(config-vrf-vpn1-ipv4-unicast)# import-map import-route-map1
```

```
device# configure terminal
device(config)# vrf vpn1
device(config-vrf-vpn1)# rd 1:2
device(config-vrf-vpn1)# vpn-statistics
device(config-vrf-vpn1)# address-family ipv6 unicast
device(config-vrf-vpn1-ipv6-unicast)# route-target-import 100:1
device(config-vrf-vpn1-ipv6-unicast)# import-map import-route-map1
```

## History

Release version	Command history
17r.1.01	This command was introduced.

# inactivity-timer

Configures the time a forwarding entry can remain unused before the device deletes it.

## Syntax

`inactivity-timer seconds`

`no inactivity-timer seconds`

## Command Default

The default inactive time is 180 seconds.

## Parameters

*seconds*

Specifies the time in seconds. The range is 60 through 3600 seconds. The default is 180 seconds.

## Modes

PIM router configuration mode

## Usage Guidelines

The **no** form of this command restores the default inactive time, 180 seconds.

A device deletes a forwarding entry if the entry is not used to send multicast packets. The Protocol Independent Multicast (PIM) inactivity timer defines how long a forwarding entry can remain unused before the device deletes it.

## Examples

This example configures an inactive time to 90 seconds.

```
device# configure terminal
device(config)# router pim
device(config-pim-router)# inactivity-timer 90
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# include-all

When a device uses CSPF to calculate the path for an LSP, it takes into account the administrative group to which an interface belongs. The user can specify which administrative groups the device can include or exclude for this calculation.

## Syntax

```
include-all admin_group_name | admin_group_number [ admin_group_name | ] admin_group_number
no include-all admin_group_name | admin_group_number [ admin_group_name | ] admin_group_number
```

## Command Default

No interfaces are assigned to the administrative groups in the default mode.

## Parameters

*admin\_group\_name*

Specifies the group, by name, the interface must be a member of. The name can be the name of the administrative group to which an administrative group number is associated by configuration in router MPLS mode. More than one parameter can be provided.

*admin\_group\_number*

Specifies the group, by number, the interface must be a member of. Number can be from 0 to 31 representing 32 admin groups. More than one parameter can be provided.

## Modes

MPLS LSP configuration mode (*config-router-mpls-lsp-lsp\_name*).

MPLS router bypass LSP configuration mode (*config-router-mpls-bypass-lsp-lsp\_name*)

MPLS router MPLS interface dynamic bypass configuration mode (*config-router-mpls-if-ethernet-slot/port-dynamic-bypass*)

## Usage Guidelines

Several administrative groups may be assigned to the LSP at the same time. The interface then must be a member of both groups.

Use the interface level **include-all** command to configure administrative groups for dynamic bypass LSPs to be created corresponding to a protected link.

The **no** form of the command removes the assigned interface.

## Examples

The following example specifies that the interface must be a member of both the "gold" and "silver" administrative groups to be included in the path calculations for LSP *tunnel1*.

```
device# configure
device(config)# router mpls
device(config-router-mpls)# lsp tunnel1
device(config-router-mpls-lsp-tunnel1)# include-all gold silver
```

The following example includes administrative groups 4, 5, and 6.

```
device# configure
device(config)# router mpls
device(config-router-mpls)# bypass-lsp by-bypass-lsp
device(config-router-mpls-bypass-lsp-by-bypass-lsp)# include-all 4 5 6
```

The following example includes administrative groups 4 and 5 on MPLS Ethernet interface 2/8.

```
device>configure
device(config)# router mpls
device(config-router-mpls)# mpls-interface ethernet 2/8
device(config-router-mpls-if-ethernet-2/8)# dynamic-bypass
device(config-router-mpls-if-ethernet-2/8-dynamic-bypass)# include-all 4 5
```

## History

Release version	Command history
16r.1.00	This command was introduced.
17r.1.00	This command was modified to include MPLS bypass LSP information.

# include-any

When a device uses CSPF to calculate the path for an LSP, it takes into account the administrative group to which an interface belongs. The user can specify which administrative groups the device can include or exclude for this calculation.

## Syntax

```
include-any admin_group_name | admin_group_name[ admin_group_number | admin_group_numbe]
no include-any admin_group_name | admin_group_name[ admin_group_number | admin_group_numbe]
```

## Command Default

No interfaces are assigned to the administrative groups in the default mode.

## Parameters

*admin\_group\_name*

Specifies the group, by name, the interface must be a member of. The name can be the name of the administrative group to which an administrative group number is associated by configuration in router MPLS mode. More than one parameter can be provided.

*admin\_group\_number*

Specifies the group, by number, the interface must be a member of. Number can be from 0 to 31 representing 32 admin groups. More than one parameter can be provided.

## Modes

MPLS LSP configuration mode (config-router-mpls-lsp-*lsp\_name* )

MPLS router Bypass LSP configuration mode (config-router-mpls-bypass-lsp-*lsp\_name*)

MPLS router MPLS interface dynamic bypass configuration mode (config-router-mpls-if-ethernet--dynamic-bypass)

## Usage Guidelines

The **no** form of the command removes the assigned interface.

Use the interface level **include-any** command to configure administrative groups for dynamic bypass LSPs to be created corresponding to a protected link.

Several administrative groups may be assigned to the LSP at the same time.

## Examples

The following example configures LSP *tunnel1* path calculations in either of the administrative groups "gold " or "silver ".

```
device# configure
device(config)# router mpls
device(config-router-mpls)# lsp tunnel1
device(config-router-mpls-lsp-tunnel1)# include-any gold silver
```

The following example includes any group designated as group 8 and 9.

```
device# configure
device(config)# router mpls
device(config-router-mpls)# bypass-lsp my-bypass-lsp
device(config-router-mpls-bypass-lsp-my-bypass-lsp)# include-any 8 9
```

The following example includes any group designated as group 6 and 7 on dynamic bypass MPLS Ethernet interface 2/8.

```
device>configure
device(config)# router mpls
device(config-router-mpls)# mpls-interface ethernet 2/8
device(config-router-mpls-if-ethernet-2/8)# dynamic-bypass
device(config-router-mpls-if-ethernet-2/8-dynamic-bypass)# include-any 6 7
```

## History

Release version	Command history
16r.1.00	This command was introduced.
17r.1.00	This command was modified to include MPLS bypass LSP information.

# ingress-tunnel-accounting

Excludes the Ethernet header (14 bytes) and Ethernet overhead (20 bytes) and CRC overhead (four bytes) when collecting byte statistics. In other words, it counts only the size of the MPLS packet.

## Syntax

```
ingress-tunnel-accounting
no ingress-tunnel-accounting
```

## Command Default

The command is disabled, by default.

## Modes

MPLS policy configuration mode.

## Usage Guidelines

To collect accurate statistics of the bypass LSP, it is necessary to configure ingress tunnel accounting at Label Switch Routers (LSR).

The **no** form of the command disables the configuration.

## Examples

The example below is a sample configuration for the command.

```
device# configure
device(config)# router mpls
device(config-router-mpls)# policy
device(config-router-mpls-policy) ingress-tunnel-accounting
```

## History

Release version	Command history
16r.1.01	This command was introduced.



# insight enable

Configures a port-channel as an insight interface.

## Syntax

```
insight enable [ mmid 1 | mmid 2 ]
```

```
no insight enable [ mmid 1 | mmid 2 ]
```

## Command Default

Port-channels 1 and 2 are not created by default.

## Parameters

**mmid 1**

Specifies management module 1.

**mmid 2**

Specifies management module 1.

## Modes

Interface subtype configuration mode

## Usage Guidelines

Use the **no** form of this command to disable an insight interface on the port-channel.

The connector must be enabled to support the insight interface, by means of the **insight mode** command.

## Examples

This example enables an insight interface on a connector.

```
device# configure terminal
device(config)# hardware
device(config-hardware)#
device(config-hardware)# connector 0/48
device(config-connector-0/48)# insight mode
```

This example uses the **insight enable** command to enable an insight interface on a port-channel.

```
device# configure terminal
device(config)# interface port-channel 22
device(config-Port-channel-22)# insight enable
```

Use the **show interface port-channel** and show port-channel commands to confirm the configuration.

```
device# show interface port-channel 22
Port-channel 22 is up, line protocol is up
Hardware is AGGREGATE, address is 609c.9f5a.4558
  Current address is 609c.9f5a.4558
Interface index (ifindex) is 671088673
Minimum number of links to bring Port-channel up is 1
MTU 1548 bytes
LineSpeed Actual      : 10000 Mbit
Allowed Member Speed : 10000 Mbit
Priority Tag disable
Forward LACP PDU: Disable
Route Only: Disabled
Last clearing of show interface counters: 1d23h53m
Queueing strategy: fifo
Receive Statistics:
  0 packets, 0 bytes
  Unicasts: 0, Multicasts: 0, Broadcasts: 0
  64-byte pkts: 0, Over 64-byte pkts: 0, Over 127-byte pkts: 0
  Over 255-byte pkts: 0, Over 511-byte pkts: 0, Over 1023-byte pkts: 0
  Over 1518-byte pkts(Jumbo): 0
  Runts: 0, Jabbers: 0, CRC: 0, Overruns: 0
  Errors: 0, Discards: 0
Transmit Statistics:
  5 packets, 380 bytes
  Unicasts: 0, Multicasts: 5, Broadcasts: 0
  Underruns: 0
  Errors: 0, Discards: 0
Rate info:
  Input 0.000000 Mbits/sec, 0 packets/sec, 0.00% of line-rate
  Output 0.000000 Mbits/sec, 0 packets/sec, 0.00% of line-rate
Route-Only Packets Dropped: 0
Time since last interface status change: 00:00:21

device# show port-channel 22
Static Aggregator: Po 22
Aggregator type: Standard
Number of Ports: 1
Member ports:
  Eth 0/125  *
```

#### NOTE

For the SLX 9850 series, slot IDs are x/125 and x/i26. For the SLX 9540, the slot ID is 0/125.

## History

Release version	Command history
17r.1.00	This command was introduced.

# insight mode

Enables an insight interface on connector.

## Syntax

**insight mode**

**no insight mode**

## Command Default

An insight interface is not enabled.

## Modes

Hardware configuration mode for a connector

## Usage Guidelines

This command is required to enable an insight interface for a port-channel.

Use the **no** form of this command to disable the insight interface.

## Examples

This example enables an insight interface on a connector.

```
device# configure terminal
device(config)# hardware
device(config-hardware)#
device(config-hardware)# connector 0/48
device(config-connector-0/48)# insight mode
```

This example uses the **insight enable** command to enable an insight interface on a port-channel.

```
device# configure terminal
device(config)# interface port-channel 22
device(config-Port-channel-22)# insight enable
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# install-igp-cost

Configures the device to use the IGP cost instead of the default BGP Multi-Exit Discriminator (MED) value as the route cost when the route is added to the Routing Table Manager (RTM).

## Syntax

```
install-igp-cost
no install-igp-cost
```

## Modes

BGP configuration mode

## Usage Guidelines

By default, BGP uses the BGP MED value as the route cost when the route is added to the RTM. Use this command to change the default to the IGP cost.

The **no** form of the command restores the defaults.

## Examples

The following example configures the device to compare MEDs.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# install-igp-cost
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# instance

Maps a VLAN to a Multiple Spanning Tree Protocol (MSTP) instance. You can group a set of VLANs to an instance.

## Syntax

```
instance instance_id [ vlan vlan_id | priority priority_id ]
```

```
no instance
```

## Command Default

The priority value is 32768.

## Parameters

*instance\_id*

Specifies the MSTP instance. Valid values range from 1 through 31.

**vlan** *vlan\_id*

Specifies the VLAN to map an MSTP instance. Refer to the Usage Guidelines.

**priority** *priority\_id*

Specifies the priority for the specified instance. Valid values range from 0 through 61440. The priority values can be set only in increments of 4096.

## Modes

Spanning tree MSTP configuration mode

## Usage Guidelines

The following rules apply:

- VLANs must be created before mapping to instances.
- The VLAN instance mapping is removed from the configuration if the underlying VLANs are deleted.

Enter **no instance** to remove the VLAN mapping from the MSTP instance.



### CAUTION

This command can be used only after the VLAN is defined.

## Examples

To map a VLAN to an MTSP instance:

```
device# configure terminal
device(config)# protocol spanning-tree mstp
device(conf-mstp)# instance 1 vlan 2,3
device(conf-mstp)# instance 2 vlan 4-6
device(conf-mstp)# instance 1 priority 4096
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# interface ethernet

Configures an Ethernet interface

## Syntax

```
interface ethernet { slot/port }
```

## Command Default

No Ethernet interface is configured.

## Parameters

*slot/port*

Specifies a slot and port.

## Modes

Global configuration mode

## Examples

To configure interface Ethernet 1/1:

```
device# configure terminal
device(config)# interface ethernet 1/1
device(conf-if-eth-1/1)#
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# interface loopback

Configures a loopback interface.

## Syntax

```
interface loopback port_number  
no interface loopback port_number
```

## Command Default

A loopback interface is not configured.

## Parameters

*port\_number*  
Specifies the port number for the loopback interface. Range is 1 through 255.

## Modes

Global configuration mode

## Usage Guidelines

A loopback is a logical interface traditionally used to ensure stable routing operations.

Use the **no** form of this command to remove the specified loopback interface.

The following restrictions apply when the loopback interface is part of an active VXLAN overlay gateway. These restrictions are enforced to maintain consistency across the gateway.

- The loopback interface cannot be deleted.
- The IPv4 address cannot be changed.
- The VRF instance cannot be changed.

You must first use the **no activate** command in VXLAN overlay gateway configuration mode to modify the loopback interfaces. .

Use the **no** form of this command with a port parameter to remove the specified loopback interface.

## Examples

The following example creates a loopback interface with a port number of 25.

```
device# configure terminal  
device(config)# interface loopback 25  
device(config-Loopback-25)#
```



## History

Release version	Command history
17r.1.00	This command was introduced.

# interface management

Accesses management interface configuration mode for the specified management interface.

## Syntax

```
interface management { 1 | 2 }
```

## Parameters

- 1  
Accesses the configuration mode for management interface 1.
- 2  
Accesses the configuration mode for management interface 2.

## Modes

Global configuration mode

## Usage Guidelines

The mode allows you to configure the parameters of the specified management interface.

## Examples

The following example accesses the interface management mode for management interface 1.

```
device# configure terminal
device(config)# interface Management 1
device(config-Management-1)#
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# interface port-channel

Configures a port-channel interface.

## Syntax

```
interface port-channel { number }
no interface port-channel { number }
```

## Command Default

No port-channel interface is configured.

## Parameters

*number*  
Specifies a port-channel. Range is from 1 through 1024.

## Modes

Global configuration mode

## Usage Guidelines

Use the **no** form of this command to disable the interface.

## Examples

To configure a port-channel interface:

```
device# configure terminal
device(config)# interface port-channel 10
device(config-Port-channel-10)#
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# interface ve

Configures a virtual Ethernet (VE) interface.

## Syntax

```
interface ve vlan_id
```

```
no interface ve vlan_id
```

## Parameters

*vlan\_id*

Specifies the corresponding VLAN that must already be created before the VE interface can be created. Refer to the Usage Guidelines.

## Modes

Global configuration mode

## Usage Guidelines

Before you can configure a VE interface, you must create a corresponding VLAN. The VE interface must use the corresponding VLAN ID.

Use the **no** form of this command to remove a specified VE interface.

## Examples

The following example shows the steps needed to create a VE interface with the VLAN ID of 56. This example assumes that VLAN 56 has already been created.

```
device# configure terminal
device(config)# interface ve 56
device(config-Ve-56)#
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# interval

For an implementation of an event-handler profile, specifies the number of seconds between iterations of an event-handler action, if triggered.

## Syntax

`interval seconds`

`no interval`

## Command Default

Iterations occur with no interval between them.

## Parameters

*seconds*

Specifies the number of seconds between iterations of an event-handler action, if triggered. Valid values are 0 or a positive integer.

## Modes

Event-handler activation mode

## Usage Guidelines

The **interval** command is effective only if the **iterations** value is non-zero.

The **no** form of this command resets the **interval** setting to the default 0 seconds.

## Examples

The following example sets the number of iterations to 3 and specifies an interval of 10 seconds between each iteration.

```
device# configure terminal
device(config)# event-handler activate eventHandler1
device(config-activate-eventHandler1)# iterations 3
device(config-activate-eventHandler1)# interval 10
```

The following example resets **interval** to the default value of 0 seconds.

```
device# configure terminal
device(config)# event-handler activate eventHandler1
device(config-activate-eventHandler1)# no interval
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ip access-group

Applies rules specified in an IPv4 access control list (ACL) to traffic entering or exiting an interface.

## Syntax

```
ip access-group ACLname { in | out }
```

```
no ip access-group ACLname { in | out }
```

## Parameters

*ACLname*

Specifies the name of the standard or extended IPv4 access list.

**in**

Applies the ACL to incoming switched and routed traffic.

**out**

Applies the ACL to outgoing routed traffic.

## Modes

Interface subtype configuration mode

## Usage Guidelines

Use this command to apply an IPv4 ACL to one of the following interface types:

- User interfaces
  - Physical Ethernet interfaces
  - Logical interfaces (LAGs)
  - Virtual Ethernet interfaces (VEs)
- All supported management interfaces

You can apply a maximum of five ACLs to a user interface, as follows:

- One ingress MAC ACL—if the interface is in switchport mode
- One egress MAC ACL—if the interface is in switchport mode
- One ingress IPv4 ACL
- One egress IPv4 ACL
- One ingress IPv6 ACL

You can apply a maximum of two ACLs to a management interface, as follows:

- One ingress IPv4 ACL
- One ingress IPv6 ACL

You can apply an ACL to multiple interfaces. And you can apply an ACL twice—ingress and egress—to a given user interface.

To remove an ACL from an interface, enter the **no** form of this command.

## Examples

The following example applies an ingress IP ACL on an Ethernet interface:

```
device(config)# interface ethernet 2/2
device(conf-if-eth-2/9)# ip access-group ipacl2 in
```

The following example removes an ingress IP ACL from an Ethernet interface:

```
device(config)# interface ethernet 2/2
device(conf-if-eth-2/9)# no ip access-group ipacl2 in
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ip access-list

Creates a standard or extended IPv4 access control list (ACL). In ACLs, you can define rules that permit or deny network traffic based on criteria that you specify.

## Syntax

```
ip access-list { standard | extended } ACLname
no ip access-list { standard | extended } ACLname
```

## Parameters

### standard | extended

Specifies one of the following types of access lists:

#### standard

Contains rules that permit or deny traffic based on source addresses that you specify. The rules are applicable to all ports of the specified addresses.

#### extended

Contains rules that permit or deny traffic according to source and destination addresses, as well as other parameters. For example, you can also filter by port, protocol (TCP or UDP), and TCP flags.

### *ACLname*

Specifies an ACL name unique among all ACLs (Layer 2 and Layer 3). The name can be up to 63 characters in length, and must begin with an alphanumeric character. No special characters are allowed, except for the underscore and hyphen.

## Modes

Global configuration mode

## Usage Guidelines

An ACL name can be up to 63 characters long, and must begin with a-z, A-Z or 0-9. You can also use underscore (\_) or hyphen (-) in an ACL name, but not as the first character.

After you create an ACL, use the **seq** command to create filtering rules for that ACL.

An ACL starts functioning only after it is applied to an interface, using the **access-group** command.

To delete an ACL, use the **no access-list** command. You can delete an ACL only after you first remove it from all interfaces to which it is applied, using the **no access-group** command.

## Examples

The following example creates an IPv4 standard ACL.

```
device# configure
device(config)# ip access-list standard stdACL3
```



The following example creates an IPv4 extended ACL.

```
device# configure
device(config)# ip access-list extended extdACL5
```

The following example creates rules on an IPv4 standard ACL.

```
device# configure
device(config)# ip access-list standard stdACL3
device(conf-ipacl-std)# seq 5 permit host 10.20.33.4
device(conf-ipacl-std)# seq 15 deny any
```

The following example deletes an IPv4 ACL.

```
device# configure
device(config)# no ip access-list standard stdACL3
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ip address

Configures an IP address on an interface.

## Syntax

```
ip address ip-address/mask ospf-ignore ] ]
```

```
no ip address [ ip-address/mask ]
```

## Parameters

*ip-address*

Specifies the IP address.

*mask*

Specifies the mask for the associated IP subnet. Dotted-decimal notation is not supported. For non-loopback interfaces, valid values are from 1 through 31. For loopback interfaces, the only valid value is 32.

**ospf-ignore**

Disables adjacency formation with OSPF neighbors and disables advertisement of the interface to OSPF.

**ospf-passive**

Disables adjacency formation with OSPF neighbors but does not disable advertisement of the interface to OSPF.

## Modes

Interface configuration mode

Management interface configuration mode

## Usage Guidelines

- Use this command to configure a primary or secondary IP address for a specific interface. You can also use this command to prevent OSPF from running on specified subnets. Multiple primary IP addresses are supported on an interface.
- You can use this command to configure a primary or secondary IP address for a management interface.
- For a management interface, only one primary IP address is supported. Secondary IP addresses are not supported.
- A primary IP address cannot overlap with a previously configured IP subnet.
- A primary IP address must be configured before you configure a secondary IP address in the same subnet.
- To remove the configured static or DHCP address, enter **no ip address**. This resets the address to 0.0.0.0/0.
- The **no** form of the command removes a specific IP address from the interface.

## Examples

The following example configures a primary IP address on a specified Ethernet interface.

```
device(config)# interface ethernet 3/2
device(conf-if-eth-3/2)# ip address 10.1.1.1/24
```

The following example replaces the primary IP address of an interface .

```
device(config)# interface ethernet 3/2
device(conf-if-eth-3/2)# ip address 10.1.1.2/24 secondary
```

The following example configures a primary IP address on a management interface.

```
device(config)# interface Management 1/0
device(config-Management-1/0)# no ip address
device(config-Management-1/0)# ip address 10.1.1.2/24
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ip address (site)

Specifies the destination IPv4 address of a tunnel for a site in a VXLAN overlay gateway configuration.

## Syntax

**ip address** *IPv4\_address*

**no ip address** [*IPv4\_address*]

## Parameters

*IPv4\_address*

Specifies the IPv4 address of the destination tunnel.

## Modes

Site configuration mode

## Usage Guidelines

The tunnel mode and the source IP address are derived from the parent overlay gateway.

To change an IP addresses, you must first remove the existing address, by means of the **no ip address** *IPv4\_address* or the **no ip address** commands. This also deletes all tunnels to the site.

Only one IPv4 address is allowed. The following IPv4 addresses are not allowed:

- Broadcast addresses (0.0.0.0 through 0.255.255.255)
- Localhost loopback addresses (127.0.0.0 through 127.255.255.255)
- Multicast addresses (224.0.0.0 through 239.255.255.255)
- Reserved addresses (240.0.0.0 through 255.255.,255.255)

## Examples

The following example configures an IPv4 address of a destination tunnel for the site.

```
device# configure terminal
device(config)# overlay-gateway gateway1
device(config-overlay-gw-gateway1)# site mysite
device(config-site-mysite)# ip address 10.11.12.13
```

## History

Release version	Command history
17r.1.01	This command was introduced.

# ip arp inspection

Enables Dynamic ARP Inspection (DAI) on a VLAN.

## Syntax

```
ip arp inspection
no ip arp inspection
```

## Command Default

DAI is disabled.

## Modes

VLAN configuration mode

## Usage Guidelines

On untrusted interfaces of DAI-enabled VLANs, incoming ARP packets from permitted IP/MAC addresses are accepted only if all of the following steps were performed:

- Create the ACL, using the **arp access-list** command.
- In the ACL, create one or more rules, using the **permit ip host** command. Each rule specifies an IP/MAC address-pair.
- Apply the ACL to one or more VLANs, using the **ip arp inspection filter** command.
- Enable DAI on such VLANs, using the **ip arp inspection** command.

The **no** form of the command disables Dynamic ARP Inspection.

## Examples

The following example applies ARP\_ACL\_01 to VLAN 200 and enables DAI.

```
device# configure terminal
device(conf)# vlan 200
device(conf-vlan-200)# ip arp inspection filter ARP_ACL_01
device(conf-vlan-200)# ip arp inspection
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# ip arp inspection filter

Applies an Address Resolution Protocol (ARP) ACL to a VLAN, which is one of the steps implementing Dynamic ARP Inspection (DAI) on a VLAN.

## Syntax

```
ip arp inspection filter ACL-name  
no ip arp inspection filter
```

## Command Default

No ARP ACL is applied.

## Parameters

*ACL-name*  
Specifies which ACL is applied to the VLAN or interface.

## Modes

VLAN configuration mode  
Interface subtype configuration mode

## Usage Guidelines

On untrusted interfaces of DAI-enabled VLANs, incoming ARP packets from permitted IP/MAC addresses are accepted only if all of the following steps were performed:

- Create the ACL, using the **arp access-list** command.
- In the ACL, create one or more rules, using the **permit ip host** command. Each rule specifies an IP/MAC address-pair.
- Apply the ACL to one or more VLANs, using the **ip arp inspection filter** command.
- Enable DAI on such VLANs, using the **ip arp inspection** command.

For ARP Guard, this command applies an ARP ACL to a physical or port-channel interface.

The **no** form of the command removes the current ARP ACL from the VLAN or interface.

## Examples

The following example applies an ARP ACL named ARP\_ACL\_01 to VLAN 200.

```
device# configure terminal  
device(conf)# vlan 200  
device(conf-vlan-200)# ip arp inspection filter ARP_ACL_01
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# ip arp inspection trust

Configures an interface as trusted for all VLANs configured on it.

## Syntax

```
ip arp inspection trust
no ip arp inspection trust
```

## Command Default

The interface is untrusted.

## Modes

Interface subtype configuration mode

## Usage Guidelines

This command is supported only on Layer 2 physical or port-channel interfaces.

On trusted interfaces, all incoming ARP packets are accepted.

On untrusted interfaces of DAI-enabled VLANs, incoming ARP packets from permitted IP/MAC addresses are accepted only if all of the following steps were performed:

- Create the ACL, using the **arp access-list** command.
- In the ACL, create one or more rules, using the **permit ip host** command. Each rule specifies an IP/MAC address-pair.
- Apply the ACL to one or more VLANs, using the **ip arp inspection filter** command.
- Enable DAI on such VLANs, using the **ip arp inspection** command.

The **no** form of this command configures the interface as untrusted.

## Examples

The following example configures an Ethernet interface as trusted.

```
device# configure terminal
device(conf)# interface ethernet 2/1
device(conf-if-eth-2/1)# ip arp inspection trust
```

The following example configures a port-channel interface as untrusted.

```
device# configure terminal
device(conf)# interface port-channel 171
device(config-Port-channel-171)# no ip arp inspection trust
```



## History

Release version	Command history
17r.1.00	This command was introduced.

# ip arp-aging-timeout

Sets how long a dynamic Address Resolution Protocol (ARP) entry stays in the ARP cache. The aging timer is reset each time an ARP reply is received.

## Syntax

```
ip arp-aging-timeout value
```

```
no ip arp-aging-timeout
```

## Command Default

ARP aging timeout is globally enabled and set to 240 minutes.

## Parameters

*value*

Specifies how long an ARP entry stays in the ARP cache. Values range from 0 through 240 minutes.

## Modes

Interface subtype configuration mode

## Usage Guidelines

When the device places an entry in the ARP cache, the device also starts an aging timer for the entry. The aging timer ensures that the ARP cache does not retain learned entries that are no longer valid. An entry can become invalid when the device with the MAC address of the entry is no longer on the network.

The aging timer is reset each time an ARP reply is received.

Aging out affects dynamic (learned) entries only. Static entries do not age out.

You can modify the ARP aging timeout only at the interface level, but not at the global level.

To prevent entries from aging out, enter **ip arp-aging-timeout 0**.

The **no** form of the command restores the default aging timeout of 240 minutes.

## Examples

The following command sets the ARP aging timeout to 100 minutes on an interface.

```
device(config)# interface ethernet 3/4
device(conf-if-eth-3/4)# ip arp-aging-timeout 100
```

The following command restores the ARP aging timeout to the default value of 240 minutes on an interface.

```
device(config)# interface ethernet 3/4
device(conf-if-eth-3/4)# no ip arp-aging-timeout
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ip dhcp relay address

Configures the IP DHCP Relay on a Layer 3 interface.

## Syntax

```
ip dhcp relay address ip-addr [ use-vrf vrf-name ]
```

## Parameters

*ip-addr*

IPv4 address of the DHCP server where the DHCP client requests are to be forwarded.

**use-vrf**

Use this option if the VRF where the DHCP server is located is different from the VRF of the interface where the client is connected.

*vrf-name*

VRF name.

## Modes

Interface configuration mode

## Usage Guidelines

This command uses the IPv4 address of the DHCP server where the DHCP client requests are to be forwarded.

Enter the command while in interface configuration mode for a VE or Ethernet interface where you want to configure the IP DHCP Relay. Configure up to sixteen DHCP server IP addresses per interface.

Use the **no** version of this command to remove the IP DHCP relay from the interface. If the **use-vrf** option is not used, it is assumed that the DHCP server and interface where the client is connected are on the same VRF.

## Examples

To configure an IP DHCP Relay address on a Ve interface:

```
device# config
device(config)# interface ve 100
device(config-Ve-100)# ip dhcp relay address 3.1.2.255 use-vrf blue
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ip dhcp relay gateway address

Configures the IP DHCP Relay on a Layer 3 gateway interface.

## Syntax

`ip dhcp relay gateway address ip-addr`

`no ip dhcp relay gateway address ip-addr`

## Parameters

*ip-addr*

IPv4 gateway address of the DHCP server where the DHCP client requests are to be forwarded.

## Modes

Interface configuration mode

## Usage Guidelines

Use this command to configure the IP DHCP Relay on the switch Layer 3 gateway interface using the IPv4 address of the DHCP server where the DHCP client requests are to be forwarded.

Use the **no** version of this command to remove the IP DHCP Relay from the interface.

## Examples

To configure an IP DHCP Relay address on an interface:

```
device(config)# interface ethernet 1/4
device(config-if-eth-1/4)# ip dhcp relay gateway 10.50.22.26
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ip dns

Configures the Domain Name System (DNS) domain name and the primary and secondary name server IP addresses.

## Syntax

```
ip dns { domain-name domain-name | name-server ip-address-of-name-server }
no ip dns { domain-name domain-name | name-server ip_address_of_name_server }
```

## Parameters

**domain-name** *domain-name*

Specifies the DNS domain name.

**name-server** *ip-address-of-name-server*

Specifies the IP address of the name server. IPv6 and IPv4 addresses are supported.

## Modes

Global configuration mode

## Usage Guidelines

- Your first run of **ip dns name-server** specifies the default IP gateway address. Your second run of **ip dns name-server** specifies the secondary IP gateway address.
- Name servers can only be entered or removed one at a time. The newly entered name server will append to the existing name server.
- The **no** form of the command with the domain-name parameter disables IP directed broadcasts for a specific domain.
- The **no** form of the command with the name-server parameter deletes a name server definition.

## Examples

The following example configures the DNS domain name and the primary name server IP address.

```
device(config)# ip dns domain-name mycompany.com
device(config)# ip dns name-server 10.70.20.1
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ip icmp rate-limiting

Limits the rate at which IPv4 Internet Control Message Protocol (ICMP) messages are sent on a network.

## Syntax

```
ip icmp rate-limiting milliseconds
no ip icmp rate-limiting
```

## Command Default

This command is enabled on the management port, but is disabled on the front-end ports.

## Parameters

*milliseconds*

Time interval per ICMP packet in milliseconds. The range is from 0 through 4294967295. The default is 1000.

## Modes

Interface configuration mode

## Usage Guidelines

This is an interface-specific configuration.

The **no** form of the command will revert to the default setting. Set the interval to 0 to disable IPv4 ICMP rate-limiting.

## Examples

The following example enables IPv4 ICMP rate-limiting on an Ethernet interface.

```
device(config)# interface ethernet 3/5
device(conf-int-eth-3/5)# ip icmp rate-limiting 10000
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ip icmp redirect

Enables IPv4 Internet Control Message Protocol (ICMP) Redirect messages, which request that packets be sent on an alternative route.

## Syntax

```
ip icmp redirect
no ip icmp redirect
```

## Command Default

This command is enabled on both the management port and on the front-end ports.

## Modes

Interface configuration mode

## Usage Guidelines

This is an interface-specific configuration.

The **no** form of the command disables IPv4 ICMP Redirect messages.

## Examples

The following example enables IPv4 ICMP Redirect messages on an Ethernet interface.

```
device(config)# interface ethernet 2/5
device(conf-int-eth-2/5)# ip icmp redirect
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# ip igmp immediate-leave

Removes a group from the IGMP table immediately following receipt of a Leave Group request.

## Syntax

```
ip igmp immediate-leave
```

```
no ip igmp immediate-leave
```

## Command Default

This command is disabled.

## Modes

Interface subtype configuration mode

## Usage Guidelines

This command treats an interface as if it had one multicast client, so that the receipt of a Leave Group request on the interface causes the group to be removed immediately from the multicast database.

Enter the **no** form of this command to restore the default behavior.

## Examples

To configure an Ethernet interface to remove a group from the IGMP table immediately following receipt of a Leave Group request:

```
device(config)# interface ethernet 1/1
device(conf-if-eth-1/1)# ip igmp immediate-leave
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ip igmp last-member-query-interval

Sets the IGMP last-member query interval for an interface.

## Syntax

```
ip igmp last-member-query-interval milliseconds
no ip igmp last-member-query-interval
```

## Command Default

See Parameters.

## Parameters

*milliseconds*

Response time in milliseconds. Range is from 100 through 25500 milliseconds. The default is 1000.

## Modes

Interface subtype configuration mode

## Usage Guidelines

The last-member query interval is the time in seconds that the IGMP router waits to receive a response to a group-specific query message, including messages sent in response to a host-leave message.

Enter the **no** form of this command to restore the default.

## Examples

To set the last-member query interval to 1500 milliseconds on an interface:

```
device(config)# interface ethernet 1/1
device(conf-if-eth-1/1)# ip igmp last-member-query-interval 1500
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ip igmp query-interval

Sets the IGMP query interval for an interface.

## Syntax

```
ip igmp query-interval seconds
```

```
no ip igmp query-interval seconds
```

## Command Default

See Parameters.

## Parameters

*seconds*

Response time in seconds. Range is from 1 through 18000 seconds. The default is 125.

## Modes

Interface subtype configuration mode

## Usage Guidelines

The query interval is the amount of time between IGMP query messages sent by the device.

Enter the **no** form of this command to restore the default.

## Examples

To set the query interval to 500 seconds on an interface:

```
device(config)# interface ethernet 1/1
device(conf-if-eth-1/1)# ip igmp query-interval 500
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ip igmp query-max-response-time

Sets the maximum response time for IGMP queries for an interface.

## Syntax

```
ip igmp query-max-response-time seconds
no ip igmp query-max-response-time
```

## Command Default

See Parameters.

## Parameters

*seconds*

Response time in seconds. Range is from 1 through 25 seconds. The default is 10.

## Modes

Interface subtype configuration mode

## Usage Guidelines

When a host receives the query packet, it starts counting to a random value, less than the maximum response time. When this timer expires, the switch (host) replies with a report, provided that no other host from the same group has responded yet.

Enter the **no** form of this command to restore the default.

## Examples

To set the maximum response time to 20 seconds:

```
device# configure terminal
device(config)# interface ethernet 1/1
device(conf-if-eth-1/1)# ip igmp query-max-response-time 20
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ip igmp router-alert-check-disable

Disables the snooping check for the presence of the router alert option.

## Syntax

```
ip igmp router-alert-check-disable  
no ip igmp router-alert-check-disable
```

## Modes

Global configuration mode

## Usage Guidelines

By default, IGMP snooping checks for the presence of the router alert option in the IP packet header of the IGMP message. Packets that do not include this option are dropped.

## Examples

The following example disables the snooping router alert check globally.

```
device(config)# ip igmp router-alert-check-disable
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ip igmp snooping enable

Enables Internet Group Management Protocol (IGMP) snooping.

## Syntax

`ip igmp snooping enable`

`no ip igmp snooping enable`

## Modes

VLAN configuration mode

## Usage Guidelines

IGMP snooping allows a network device to listen in on the IGMP conversation between hosts and routers. By listening to these conversations, the switch maintains a map of which links need which IP multicast streams. Multicasts may be filtered from the links which do not need them.

Enter `no ip igmp snooping enable` to disable snooping for a specific VLAN.

## Examples

To enable IGMP on a VLAN:

```
device(config)# vlan 1
device(config-vlan-1)# ip igmp snooping enable
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ip igmp snooping fast-leave

Enables Internet Group Management Protocol (IGMP) snooping fast-leave processing for a VLAN. This allows the removal of an interface from the forwarding table without sending out group-specific queries to the interface.

## Syntax

```
ip igmp snooping fast-leave
```

```
no ip igmp snooping fast-leave
```

## Command Default

This command is disabled.

## Modes

VLAN configuration mode.

## Usage Guidelines

Enter **no ip igmp snooping fast-leave** to disable this function.

## Examples

To enable snooping fast-leave for a specific VLAN:

```
device(config)# vlan 1
device(config-vlan-1)# ip igmp snooping fast-leave
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ip igmp snooping last-member-query-interval

Sets the IGMP snooping last member query interval value in milliseconds.

## Syntax

```
ip igmp snooping last-member-query-interval value  
no ip igmp snooping last-member-query-interval value
```

## Command Default

The default is 1000 ms.

## Parameters

*value*  
Sets the value in milliseconds. The range is 100 to 25500 milliseconds.

## Modes

VLAN configuration mode

## Usage Guidelines

When a leave is received, a group-specific query is sent. Last member query interval configuration controls the time interval between last member queries sent.

## Examples

The following example sets the IGMP snooping last member query interval.

```
device(config)# vlan 1  
device(config-Vlan-1)# ip igmp snooping last-member-query-interval 2000
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# ip igmp snooping mrouter interface

Configures a VLAN port member to be a multicast router interface.

## Syntax

```
ip igmp snooping mrouter interface { ethernet slot/port | port-channel interface number }
no ip igmp snooping mrouter interface { ethernet slot/port | port-channel interface number }
```

## Parameters

**ethernet** *slot/port*

Specifies a valid port number.

**port-channel** *number*

Specifies the interface is a port-channel. Valid values range from 1 through 6144.

## Modes

VLAN configuration mode

## Usage Guidelines

A multicast router interface faces toward a multicast router or other Internet Group Management Protocol (IGMP) querier.

The **no** form of this command removes the configured mrouter.

## Examples

The following example configures a VLAN port member to be a multicast router interface.

```
device(config)# vlan 1
device(config-vlan-1)# ip igmp snooping mrouter interface ethernet 1/1
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ip igmp snooping querier enable

Activates or deactivates the Internet Group Management Protocol (IGMP) snooping querier on a VLAN.

## Syntax

```
ip igmp snooping querier enable  
no ip igmp snooping querier enable
```

## Command Default

IGMP snooping querier is disabled.

## Modes

VLAN configuration mode

## Usage Guidelines

Enter **no ip igmp snooping querier enable** to disable the IGMP snooping querier.

## Examples

To enable the IGMP snooping querier on the VLAN:

```
device(config)# vlan 1  
device(config-vlan-1)# ip igmp snooping querier enable
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ip igmp snooping query-interval

Sets the IGMP snooping query interval in seconds.

## Syntax

`ip igmp snooping query-interval seconds`

`no ip igmp snooping query-interval seconds`

## Command Default

The default is 125 seconds.

## Parameters

*seconds*

Sets the IGMP snooping query interval in seconds. The range is 1-18000 seconds.

## Modes

VLAN configuration mode

## Usage Guidelines

The `ip igmp snooping query-interval` command allows you to modify the query interval, which specifies how often the SLX-OS device enabled for active IGMP snooping sends group membership queries.

## Examples

The following example sets the IGMP snooping query interval.

```
device(config)# vlan 1
device(config-vlan-1)# ip igmp snooping query-interval 200
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ip igmp snooping query-max-response-time

Sets the IGMP snooping query maximum response time.

## Syntax

`ip igmp snooping query-max-response-time seconds`

`no ip igmp snooping query-max-response-time seconds`

## Command Default

The default is 10 seconds.

## Parameters

*seconds*

Specifies the IGMP snooping query maximum response time in seconds. The range is 1 to 25 seconds.

## Modes

VLAN configuration mode

## Usage Guidelines

The IGMP snooping query maximum response time is the length of time in seconds that the device will wait for an IGMP (V1 or V2) response from an interface before concluding that the group member on that interface is down and removing it from the group.

## Examples

The following example sets the IGMP snooping query max response time.

```
device(config)# vlan 1
device(config-Vlan-1)# ip igmp snooping query-max-response-time 15
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ip igmp snooping static-group

Configures an interface in a VLAN as a static member of a multicast group.

## Syntax

```
ip igmp snooping static-group { ip-address } {interface ethernet/port-channel }
ip igmp snooping static-group { ip-address } {interface ethernet/port-channel }
```

## Parameters

*ip-address*

Specifies the multicast address to be joined in the A.B.C.D format.

**interface**

Specifies the interface.

*ethernet/port-channel*

Specifies the interface type.

## Modes

VLAN configuration mode

## Usage Guidelines

A snooping-enabled VLAN cannot forward multicast traffic to ports that do not receive IGMP membership reports. If clients cannot send reports, you can configure a static group which applies to specific ports. The static group allows packets to be forwarded to the static group ports even though they have no client membership reports.

## Examples

The following example sets the IGMP snooping static-group.

```
device# configure terminal
device(config)# vlan 10
device(config-vlan-10)# ip igmp snooping static-group 225.0.0.1 interface ethernet 6/15
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ip igmp ssm-map

Enables the IGMPv2 Source Specific Multicast mapping.

## Syntax

```
ip igmp ssm-map [ ASCII string | enable source-address ]
no ip igmp ssm-map [ ASCII string | enable source-address ]
```

## Parameters

*ASCII string*

Specifies the prefix list name.

**enable***source-address*

Specifies the source address.

## Modes

Global configuration mode

Router PIM configuration mode

## Usage Guidelines

A prefix list is used for SSM mapping with permit clauses.

Use the **no** form of this command to disable SSM mapping.

## Examples

The following example enables the SSM mapping for IGMPv2 and configures an SSM map at the global level.

```
device(config)# ip igmp ssm-map enable
device(config)# ip igmp ssm-map ssm-map-230-to-232 203.0.0.10
device(config)# ip igmp ssm-map ssm-map-233-to-234 204.0.0.10
```

The following example enables the SSM range configuration at the router PIM level.

```
device(config)# router pim
  device(config-pim-router)# ssm-enable range PL_ssm_range -230-to-234
```

The following example shows a prefix list configuration for the SSM range.

```
device(config)# ip prefix-list PL_ssm_range seq 5 permit 230.0.0.0/8
device(config)# ip prefix-list PL_ssm_range seq 10 permit 231.0.0.0/8
device(config)# ip prefix-list PL_ssm_range seq 10 permit 232.0.0.0/8
device(config)# ip prefix-list PL_ssm_range seq 10 permit 233.0.0.0/8
device(config)# ip prefix-list PL_ssm_range seq 10 permit 234.0.0.0/8
```

The following example shows a prefix list configuration for an SSM map.

```
device(config)# ip prefix-list ssm-map-230-to-232 seq 5 permit 230.0.0.0/8
device(config)# ip prefix-list ssm-map-230-to-232 seq 10 permit 231.0.0.0/8
device(config)# ip prefix-list ssm-map-230-to-232 seq 15 permit 232.0.0.0/8

device(config)# ip prefix-list ssm-map-233-to-234 seq 5 permit 233.0.0.0/8
device(config)# ip prefix-list ssm-map-233-to-234 seq 10 permit 234.0.0.0/8
device(config)# ip prefix-list ssm-map-230-to-232 seq 15 permit 232.0.0.0/8
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ip igmp static-group

Configures the IGMP static group membership entries for a specific interface.

## Syntax

```
ip igmp static-group A.B.C.D
no ip igmp static-group A.B.C.D
```

## Parameters

*A.B.C.D*

Specifies the group address, as a subnet number in dotted decimal format (for example, 10.0.0.1), as the allowable range of addresses to be included in the multicast group.

## Modes

Interface subtype configuration mode

## Usage Guidelines

The **ip igmp static-group** command creates IGMP static group membership to test multicast forwarding without a receiver host. Traffic is forwarded to an interface without the need to receive membership reports from host members. Packets to the group are fast-switched out of a specific interface. Static group membership entries are automatically added to the IGMP cache and the PIM mcache table.

## Examples

To create a static multicast group for an interface:

```
device(config)# interface ethernet 1/1
device(conf-if-eth-1/1)# ip igmp static-group 225.0.0.10 interface ethernet 6/15
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# ip igmp version

Specifies the IGMP version on a device.

## Syntax

```
ip igmp version version-number
no ip igmp version version-number
```

## Command Default

IGMP Version 2 is enabled.

## Parameters

*version-number*

Specifies the version number: 1, 2, or 3. Version 2 is the default.

## Modes

Interface configuration mode

## Usage Guidelines

The **no** form of this command restores the default; IGMP Version 2 is enabled.

## Examples

The following example, in interface configuration mode, enables IGMP Version 3 for a physical port.

```
device# configure terminal
device(config)# interface ethernet 1/5
device(config-if-1/5)# ip igmp version 3
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ip interface loopback (overlay gateway)

Sets the loopback port number for the VXLAN overlay gateway.

## Syntax

```
ip interface loopback loopback_id  
no ip interface loopback loopback_id
```

## Parameters

*loopback\_id*  
Specifies a loopback interface. Range is from 1 through 255.

## Modes

Overlay gateway configuration mode

## Usage Guidelines

Use the **no** form of this command to delete the interface from the gateway.

## Examples

The following example configures a loopback interface to the overlay gateway instance.

```
device# configure terminal  
device(config)# overlay-gateway gateway1  
device(config-overlay-gw-gateway1)# ip interface loopback 10
```

## History

Release version	Command history
17r.1.01	This command was introduced.

# ip mtu

Sets the IP maximum transmission unit (MTU) on a specified interface.

## Syntax

`ip mtu size`

`no ip mtu`

## Command Default

The default IP MTU size is 1500 bytes.

## Parameters

*size*

Specifies the size of an interface IP MTU. Values range from 1300 through 9194 bytes.

## Modes

Interface configuration mode

## Usage Guidelines

If the interface is part of a VE, change the IPv4 MTU only at the VE interface and not at the physical port. All member ports of a VE inherit the VE-interface IPv4 MTU value.

The **no** form of the command reverts the MTU size to the default value.

## Examples

The following example sets the IP MTU to 2000 bytes on the specified Ethernet interface.

```
device# configure terminal
device(config)# interface ethernet 2/9
device(config-if-eth-2/9)# ip mtu 2000
```

The following example changes the IP MTU for a VE.

```
device(config)# interface ve 103
device(config-vif-103)# ip mtu 2000
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ip ospf active

Sets a specific OSPF interface to active.

## Syntax

```
ip ospf active
```

## Modes

Interface subtype configuration mode

## Usage Guidelines

Use the **ip ospf active** command on each interface participating in adjacency formation. This command overrides the global passive setting on that interface, and enables transmission of OSPF control packets.

## Examples

The following example sets a specific OSPFv2 Ethernet interface to active.

```
device# configure terminal
device(config)# interface ethernet 1/1
device(conf-if-eth-1/1)# ip ospf active
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ip ospf area

Enables OSPFv2 on an interface.

## Syntax

```
ip ospf area area-id | ip-addr
no ip ospf area
```

## Command Default

Disabled.

## Parameters

*area-id*  
Area ID in decimal format. Valid values range from 1 through 2147483647.

*ip-addr*  
Area ID in IP address format.

## Modes

Interface subtype configuration mode

## Usage Guidelines

The **no** form of the command disables OSPFv2 on the interface.

## Examples

The following example enables a configured OSPFv2 area named 1 on a specific OSPFv2 virtual Ethernet (VE) interface.

```
device# configure terminal
device(config)# interface ve 1
device(config-if-Ve-1)# ip ospf area 1
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ip ospf auth-change-wait-time

Configures authentication-change hold time.

## Syntax

```
ip ospf auth-change-wait-time wait-time  
no ip ospf auth-change-wait-time
```

## Command Default

Wait time is 300 seconds

## Parameters

*wait-time*

Time before an authentication change takes place. Valid values range from 0 to 14400 seconds.

## Modes

Interface subtype configuration mode

## Usage Guidelines

Use this command to set or reset the authentication change hold time for the interface to which you are connected.

OSPFv2 provides graceful authentication change for the following types of authentication changes:

Changing authentication methods from one of the following to another of the following:

- Simple text password
- MD5 authentication
- No authentication

Configuring a new simple text password or MD5 authentication key.

Changing an existing simple text password or MD5 authentication key

The **no** form of the command resets the wait time to the default of 300 seconds.

## Examples

The following example sets the wait time to 400 seconds on a specific OSPF virtual Ethernet (VE) interface.

```
device# configure terminal  
device(config)# interface ve 1  
device(config-if-Ve-1)# ip ospf auth-change-wait-time 400
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ip ospf authentication-key

Configures simple password-based authentication for OSPF.

## Syntax

```
ip ospf authentication-key password
no ip ospf authentication-key
```

## Command Default

Authentication is disabled.

## Parameters

*password*  
OSPF processes *password* as a plain text password.

## Modes

Interface subtype configuration mode

## Usage Guidelines

Use this command to set or reset simple password-based authentication on the OSPFv2 interface to which you are connected. The **no** form of the command disables OSPFv2 authentication.

## Examples

The following example configures an authentication key for an OSPF virtual Ethernet (VE) interface.

```
device# configure terminal
device(config)# interface ve 1
device(config-if-Ve-1)# ip ospf authentication-key morningadmin
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# ip ospf bfd

Enables Bidirectional Forwarding Detection (BFD) on a specific OSPFv2 interface.

## Syntax

```
ip ospf bfd
```

```
no ip ospf bfd
```

## Modes

Interface subtype configuration mode

## Usage Guidelines

BFD sessions are initiated only if BFD is also enabled globally using the **bfd** command in OSPF router configuration mode. If BFD is disabled using the **no bfd** command in OSPF router configuration mode, BFD sessions on specific OSPFv2 interfaces are deregistered.

The **no** form of the command removes all BFD sessions from a specified interface.

## Examples

The following example enables BFD on an OSPF Ethernet interface.

```
device# configure terminal
device(config)# interface ethernet 1/4
device(config-if-eth-1/4)# ip ospf bfd
```

The following example disables BFD on an OSPF virtual Ethernet (VE) interface.

```
device# configure terminal
device(config)# interface ve 24
device(config-if-ve-24)# no ip ospf bfd
```

## History

Release version	Command history
17r.1.01	This command was introduced.

# ip ospf cost

Configures cost for a specific interface.

## Syntax

```
ip ospf cost value
no ip ospf cost
```

## Command Default

Cost value is 1.

## Parameters

*value*

Cost value. Valid values range from 1 through 65535. The default is 1.

## Modes

Interface subtype configuration mode

## Usage Guidelines

Use this command to set or reset the OSPFv2 cost on the interface. If the cost is not configured with this command, OSPFv2 calculates the value from the reference and interface bandwidths.

The **no** form of the command disables the configured cost.

## Examples

The following example sets the cost to 520 on a specific Loopback interface.

```
device# configure terminal
device(config)# interface loopback 1
device(config-Loopback-1)# ip ospf cost 520
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ip ospf database-filter

Configures filters for different types of outgoing Link State Advertisements (LSAs).

## Syntax

```
ip ospf database-filter { all-external | all-summary-external { allow-default-and-type-4 | allow-default-out | out } }
ip ospf database-filter all-out
no ip ospf database-filter all-external
no ip ospf database-filter all-out
no ip ospf database-filter all-summary-external
```

## Command Default

All filters are disabled.

## Parameters

### all-external

Blocks all external LSAs.

### all-summary-external

Blocks all summary (Type 3) and external (type 5) LSAs.

### allow-default-and-type-4

Allows default-route LSAs and Type 4 LSAs, but block all other LSAs.

### allow-default-out

Allows default-route LSAs, but block all other LSAs.

### out

Filters outgoing LSAs.

### all-out

Blocks all LSAs.

## Modes

Interface subtype configuration mode

## Usage Guidelines

By default, the device floods all outbound LSAs on all the OSPF interfaces within an area. You can configure a filter to block outbound LSAs on an OSPF interface. This feature is particularly useful when you want to block LSAs from some, but not all, of the interfaces attached to the area. When enabled, this command blocks the specified outgoing LSAs on the interface. Some cases where you might want to enable filters are:

- To control the information being advertised to the network.
- To use a passive router for debugging only.

The **no** form of the command disables configurations.

**NOTE**

You cannot block LSAs on virtual links.

## Examples

The following example applies a filter to block flooding of all LSAs on a specific OSPF Ethernet interface.

```
device# configure terminal
device(config)# interface ethernet 1/1
device(conf-if-eth-1/1)# ip ospf database-filter all-out
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ip ospf dead-interval

Configures the neighbor dead interval, which is the number of seconds that a neighbor router waits for a hello packet from the device before declaring the router down.

## Syntax

```
ip ospf dead-interval interval
```

```
no ip ospf dead-interval
```

## Command Default

The specified time period is 40 seconds.

## Parameters

*interval*

Dead interval in seconds. Valid values range from 3 through 65535 seconds. The default is 40.

## Modes

Interface subtype configuration mode

## Usage Guidelines

If you change the dead interval, the hello interval is automatically changed to a value that is one fourth that of the new dead interval, unless the hello interval is also explicitly configured using the **ip ospf hello-interval** command.

The recommended setting is that:

- The dead interval is four times that of the hello interval.
- The hello interval is  $\frac{1}{4}$  times that of the dead interval.

The **running-config** command displays only explicitly configured values of the hello interval, which means that a value that was automatically changed as the result of a dead-interval change is not displayed.

The **no** form of the command restores the default value.

## Examples

The following example sets the dead interval to 200 on a specific OSPFv2 virtual Ethernet (VE) interface.

```
device# configure terminal
device(config)# interface ve 1
device(config-if-Ve-1)# ip ospf dead-interval 200
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ip ospf hello-interval

Configures the hello interval, which is the length of time between the transmission of hello packets that this interface sends to neighbor routers.

## Syntax

```
ip ospf hello-interval interval
```

```
no ip ospf hello-interval
```

## Command Default

The default value is 10 seconds.

## Parameters

*interval*

Hello interval in seconds. Valid values range from 1 through 65535.

## Modes

Interface subtype configuration mode

## Usage Guidelines

If you change the hello interval, the dead interval is automatically changed to a value that is four times that of the new hello interval, unless the dead interval is also explicitly configured using the **ip ospf dead-interval** command.

The recommended setting is that:

- The dead interval is four times that of the hello interval.
- The hello interval is  $\frac{1}{4}$  times that of the dead interval.

The **running-config** command displays only explicitly configured values of the dead interval, which means that a value that was automatically changed as the result of a hello-interval change is not displayed.

The **no** form of the command restores the default value.

## Examples

The following example sets the hello interval to 50 on a specific OSPFv2 virtual Ethernet (VE) interface:

```
device# configure terminal
device(config)# interface ve 1
device(config-if-Ve-1)# ip ospf hello-interval 50
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# ip ospf ldp-sync

Enables Label Distribution Protocol (LDP) synchronization with OSPF and configures the hold down time interval for an interface.

## Syntax

```
ip ospf ldp-sync { disable | enable }
no ip ospf ldp-sync enable
```

## Command Default

Disabled.

## Parameters

disable  
Disables LDP synchronization.

enable  
Enables LDP synchronization.

## Modes

Interface subtype configuration mode

## Examples

The following example enables LDP synchronization with OSPF for an Ethernet interface.

```
device# configure terminal
device(config)# interface ethernet 1/1
device(config-if-eth-1/1)# ip ospf ldp-sync enable
```

The following example disables LDP synchronization with OSPF for a loopback interface.

```
device# configure terminal
device(config)# interface loopback 1
device(config-loopback-1)# ip ospf ldp-sync disable
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ip ospf md5-authentication

Configures MD5 password and authentication change hold time.

## Syntax

```
ip ospf md5-authentication { key-activation-wait-time wait-time | key-id id key password }
no ip ospf md5-authentication key-id
```

## Command Default

No authentication.

## Parameters

### **key-activation-wait-time** *wait-time*

Sets the time that OSPFv2 waits before activating a new MD5 key. This parameter provides a graceful transition from one MD5 key to another without disturbing the network. All new packets transmitted after the wait time ends use the newly configured MD5 Key. OSPFv2 packets that contain the old MD5 key are accepted for up to five minutes after the new MD5 key is in operation. Valid values range from 0 to 14400 seconds.

### **key-id**

Sets MD5 key.

*id*

Identifies the MD5 key ID. Valid values range from 1 and 255.

### **key password**

Specifies the MD5 authentication ID and sets a password.

## Modes

Interface subtype configuration mode

## Usage Guidelines

Use this command to set or reset the MD5 password and/or authentication change hold time on the interface to which you are connected.

By default, the authentication key is encrypted. If you want the authentication key to be in clear text, insert a O between authentication-key and string. The software adds a prefix to the authentication key string in the configuration. For example, the following portion of the code has the encrypted code "2".

Enter **no ip ospf md5-authentication key-id** to disable this configuration.

## Examples

The following example sets the time that OSPFv2 waits before activating a new MD5 key to 240 seconds on an Ethernet interface.

```
device# configure terminal
device(config)# interface ethernet 1/1
device(conf-if-eth-1/1)# ip ospf md5-authentication key-activation-wait-time 240
```

The following example sets the MD5 key ID to 22 and a password "myospfpassword" on an Ethernet interface.

```
device# configure terminal
device(config)# interface ethernet 1/1
device(conf-if-eth-1/1)# ip ospf md5-authentication key-id 22 key myospfpassword
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ip ospf mtu-ignore

Enables or disables maximum transmission unit (MTU) match checking.

## Syntax

```
ip ospf mtu-ignore
no ip ospf mtu-ignore
```

## Command Default

Enabled

## Modes

Interface subtype configuration mode

## Usage Guidelines

In default operation, the IP MTU on both sides of an OSPFv2 link must be the same, and a check of the MTU is performed when Hello packets are first exchanged.

The **no** form of the command disables MTU-match checking on a specific interface.

## Examples

The following example disables MTU-match checking on a specific OSPFv2 Ethernet interface.

```
device# configure terminal
device(config)# interface ethernet 1/1
device(conf-if-eth-1/1)# no ip ospf mtu-ignore
```

The following example enables MTU-match checking on a specific OSPFv2 Ethernet interface.

```
device# configure terminal
device(config)# interface ethernet 1/1
device(conf-if-eth-1/1)# ip ospf mtu-ignore
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ip ospf network

Configures the network type for the interface. Point-to-point can support unnumbered links, which requires less processing by OSPF.

## Syntax

```
ip ospf network { broadcast | non-broadcast | point-to-point }  
no ip ospf network
```

## Command Default

Network type is broadcast.

## Parameters

### broadcast

Network type is broadcast.

### non-broadcast

Network type is non-broadcast. An interface can be configured to send OSPF traffic to its neighbor as unicast packets rather than multicast packets.

### point-to-point

Network type is point-to-point.

## Modes

Interface subtype configuration mode

## Usage Guidelines

On a non-broadcast interface, the devices at either end of the interface must configure non-broadcast interface type and the neighbor IP address. There is no restriction on the number of devices sharing a non-broadcast interface.

To configure an OSPF interface as a non-broadcast interface, the feature must be enabled on a physical interface or a VE, following the **ip ospf area** statement, and then specify the IP address of the neighbor in the OSPF configuration. The non-broadcast interface configuration must be done on the OSPF devices at either end of the link.

The **no** form of the command removes the network-type configuration.

## Examples

The following example configures an OSPFv2 point-to-point link on a specific OSPFv2 Ethernet interface.

```
device# configure terminal  
device(config)# interface ethernet 1/1  
device(conf-if-eth-1/1)# ip ospf network point-to-point
```

The following example configures an OSPFv2 broadcast link on a specific OSPFv2 Ethernet interface.

```
device# configure terminal
device(config)# interface ethernet 1/1
device(conf-if-eth-1/1)# ip ospf network broadcast
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ip ospf passive

Sets a specific OSPFv2 interface to passive.

## Syntax

```
ip ospf passive
```

```
no ip ospf passive
```

## Command Default

All OSPF interfaces are active.

## Modes

Interface subtype configuration mode

## Usage Guidelines

Passive interfaces accept and process all OSPF protocol traffic, but they do not send any traffic.

You might want to set an interface to passive mode if:

- You are planning to use the router mostly for debugging purposes.
- The router is a stub and does not route traffic.

The **no** form of the command sets an interface back to active.

## Examples

The following example sets a specific OSPFv2 Ethernet interface to passive.

```
device# configure terminal
device(config)# interface ethernet 1/1
device(conf-if-eth-1/1)# ip ospf passive
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ip ospf priority

Configures priority for designated router (DR) election.

## Syntax

`ip ospf priority value`

`no ip ospf priority`

## Command Default

The default value is 1.

## Parameters

*value*

Priority value. Valid values range from 0 through 255.

## Modes

Interface subtype configuration mode

## Usage Guidelines

The OSPFv2 router assigned the highest priority becomes the designated router, and the OSPFv2 router with the second-highest priority becomes the backup router.

The **no** form of the command restores the default value.

## Examples

The following example sets a priority of 10 for the OSPFv2 router that is connected to an OSPFv2 Virtual Ethernet (VE) interface.

```
device# configure terminal
device(config)# interface ve 1
device(config-if-Ve-1)# ipv6 ospf priority 10
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# ip ospf retransmit-interval

Configures the retransmit interval. The retransmit interval is the time between Link-State Advertisement (LSA) retransmissions to adjacent routers for a given interface.

## Syntax

```
ip ospf retransmit-interval interval
```

```
no ip ospf retransmit-interval
```

## Command Default

The interval is 5 seconds.

## Parameters

*interval*

Retransmit interval in seconds. Valid values range from 0 through 3600 seconds.

## Modes

Interface subtype configuration mode

## Usage Guidelines

The **no** form of the command resets the retransmit interval to its default.

## Examples

The following example sets the retransmit interval to 8 for all OSPFv2 devices on a specific OSPFv2 Ethernet interface.

```
device# configure terminal
device(config)# interface ethernet 1/1
device(conf-if-eth-1/1)# ip ospf retransmit-interval 8
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ip ospf transmit-delay

Configures transmit delay for link-update packets. The transmit delay is the estimated time required for OSPFv2 to send link-state update packets on the interface to which you are connected.

## Syntax

```
ip ospf transmit-delay value
```

```
no ip ospf transmit-delay
```

## Command Default

The transmit delay is set to 1 second.

## Parameters

*value*

Transmit delay in seconds. Valid values range from 0 through 3600 seconds.

## Modes

Interface subtype configuration mode

## Usage Guidelines

The **no** form of the command restores the default value.

## Examples

The following example sets a transmit delay of 25 seconds for devices on a specific OSPFv2 Ethernet interface.

```
device# configure terminal
device(config)# interface ethernet 1/1
device(conf-if-eth-1/1)# ip ospf transmit-delay 25
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ip pim dr-priority

Configures the designated router (DR) priority on IPv4 interfaces.

## Syntax

```
ip pim dr-priority priority-value  
no ip pim dr-priority priority-value
```

## Command Default

The default DR priority value is 1.

## Parameters

*priority-value*  
Specifies the DR priority value as an integer. The range is 0 through 65535.

## Modes

Interface configuration mode

## Usage Guidelines

The **no** form of this command restores the default DR priority value, 1.

You must enable PIM globally before you enable it on an interface.

You can configure the **ip pim dr-priority** command in either Dense mode (DM) or Sparse mode (SM).

If more than one device has the same DR priority on a subnet (as in the case of default DR priority on all), the device with the numerically highest IP address on that subnet is elected as the DR.

The DR priority information is used in the DR election only if all the PIM devices connected to the subnet support the DR priority option. If at least one PIM device on the subnet does not support this option, the DR election falls back to the backwards compatibility mode in which the device with the numerically highest IP address on the subnet is declared the DR regardless of the DR priority values.

## Examples

This example configures a DR priority value of 50.

```
device(config)# interface ethernet 1/1  
device(config-if-e10000-1/1)# ip pim dr-priority 50
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ip pim snooping enable

Enables IP PIM snooping on a VLAN.

## Syntax

```
ip pim snooping enable  
no ip pim snooping enable
```

## Modes

VLAN configuration mode

## Usage Guidelines

The **no** form of the command disables PIM snooping on the VLAN.

Use this command to enable Layer 2 PIM snooping on a VLAN. You must enable IGMP snooping on the interface before enabling PIM snooping.

## Examples

The following example enables PIM snooping on a VLAN.

```
device(config)# vlan 1  
device(config-vlan-1)# ip pim snooping enable
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# ip pim-sparse

Enables or disables Protocol Independent Multicast Sparse Mode on port channels, physical or VE interfaces.

## Syntax

```
ip pim-sparse
no ip pim-sparse
```

## Command Default

Protocol Independent Multicast (PIM) is not enabled on an interface.

## Modes

Interface subtype configuration mode

## Usage Guidelines

PIM must be enabled on the device before enabling PIM-sparse. PIM-sparse can be enabled on interfaces

Enter **no ip pim-sparse** to disable this feature.

## Examples

To enable PIM Sparse Mode on a virtual Ethernet (VE) interface:

```
device(config)# int ve 1
device(config-if-Ve-1)# ip pim-sparse
```

To enable PIM Sparse Mode on a router port:

```
device(config)# int eth 1/1
device(config-if-eth-1/1)# ip pim-sparse
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ip pim ttl-threshold

Sets the IP PIM time to live (TTL) threshold.

## Syntax

```
ip pim ttl-threshold value
no ip pim ttl-threshold
```

## Command Default

The default value is 1.

## Parameters

*priority value*  
Specifies the TTL threshold value. The range is 1 to 64.

## Modes

Interface configuration mode

## Usage Guidelines

The TTL threshold defines the minimum value required in a packet for it to be forwarded out of the interface after the TTL has been decremented.

For example, if the TTL for an interface is set at 10, only those packets that enter with a TTL value of 11 or more are forwarded through the TTL-10 interface. With a default TTL threshold of 1, only packets ingressing with a TTL of 2 or greater are forwarded. The TTL threshold only applies to routed interfaces and is ignored by switched interfaces. Possible TTL values are 1 to 64. The default TTL value is 1.

The **no** form of the command restores the default TTL threshold 1.

## Examples

The following example sets the TTL value.

```
device(config)# interface ethernet 1/1
device(config-if-e10000-1/1)# ip pim ttl-threshold 50
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ip policy route-map

Enables policy-based routing (PBR).

## Syntax

```
ip policy route-map map-name
```

```
no ip policy route-map map-name
```

## Command Default

PBR is not enabled.

## Parameters

*map-name*

Specifies the name of the route map.

## Modes

Interface configuration mode

Virtual interface configuration mode

## Usage Guidelines

The **no** form of the command disables PBR.

## Examples

The following example enables PBR on a specific interface.

```
device(config)# route-map test-route permit 99
device(config-route-map-test-route/permit/99)# match ip address acl 99
device(config-route-map-test-route/permit/99)# set ip next-hop 192.168.3.1
device(config-route-map-test-route/permit/99)# exit
device(config)# interface ethernet 1/1
device(conf-if-eth-1/1)# ip policy route-map test-route
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# ip proxy-arp

Enables Proxy Address Resolution Protocol (APR) on an interface.

## Syntax

```
ip proxy-arp
no ip proxy-arp
```

## Command Default

Proxy ARP is disabled.

## Modes

Interface subtype configuration mode

## Usage Guidelines

Proxy ARP enables a device to answer ARP requests from devices in one network on behalf of devices in another network. Because ARP requests are MAC-layer broadcasts, they reach only the devices that are directly connected to the sender of the ARP request. Therefore, ARP requests do not cross routers.

The **no** form of the command disables Proxy ARP on an interface.

## Examples

The following example enables Proxy ARP on a specified interface.

```
device(config)# interface ethernet 3/4
device(conf-if-eth-3/4)# ip proxy-arp
```

The following example disables Proxy ARP on a specified interface.

```
device(config)# interface ethernet 3/4
device(conf-if-eth-3/4)# no ip proxy-arp
```

## History

Release version	Command history
16r.1.00	This command was introduced.
17r.1.01	This command was modified, with Proxy ARP now disabled by default.

# ip receive access-group

Applies an IPv4 access control list (ACL) at global configuration level. Such *receive-path* ACLs filter incoming route-processor traffic according to rules that you create, but do not filter data-path traffic.

## Syntax

```
ip receive access-group acl-name  
no ip receive access-group acl-name
```

## Command Default

No receive-path ACLs are applied.

## Parameters

*acl-name*  
Specifies the name of the standard or extended IP access list.

## Modes

Global configuration mode

## Usage Guidelines

For both interface ACLs and receive-path ACLs, you use identical commands to create the ACLs. You also use identical commands to define permit/deny/hard-drop rules in the ACLs. The only variance is the command you use to apply the ACL:

- To apply an interface ACL, from an interface-subtype configuration mode you use the { **ip** | **ipv6** | **mac** } **access-group** command.
- To apply a receive-path ACL, from global configuration mode you use the { **ip** | **ipv6** | **mac** } **receive access-group** command.

You can apply a maximum of two receive-path ACLs to a device, as follows:

- One IPv4 receive-path ACL
- One IPv6 receive-path ACL

To remove a receive-path ACL, enter the **no** form of this command.

## Examples

The following example creates an IPv4 extended ACL, defines rules in the ACL, and applies it as a receive-path ACL.

```
device(config)# ip access-list extended ipv4-receive-acl-example
device(conf-ipacl-ext)# hard-drop tcp host 10.0.0.1 any count
device(conf-ipacl-ext)# hard-drop udp any host 20.0.0.1 count
device(conf-ipacl-ext)# permit tcp host 10.0.0.2 any eq telnet count
device(conf-ipacl-ext)# permit tcp host 10.0.0.2 any eq bgp count

device(conf-ipacl-ext)# exit
device(config)# ip receive access-group ipv4-receive-acl-example
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ip route

Adds a static route to the IP routing table.

## Syntax

```
ip route dest-ip-addr [ next-hop-vrf next-vrf-name ] next-hop-address [ metric ] [ distance distance ] [ tag tag-number ]
ip route dest-ip-addr { ethernet slot/port | ve ve-number } [ metric ] [ distance distance ] [ tag tag-number ]
ip route dest-ip-addr null 0 [ metric ] [ distance distance ] [ tag tag-number ]
no ip route dest-ip-addr [ next-hop-vrf next-vrf-name ] next-hop-address [ metric ] [ distance distance ] [ tag tag-number ]
no ip route dest-ip-addr { ethernet slot/port | ve ve-number } [ metric ] [ distance distance ] [ tag tag-number ]
no ip route dest-ip-addr null 0 [ metric ] [ distance distance ] [ tag tag-number ]
```

## Parameters

**next-hop-vrf** *vrf-name*

Specifies the name of the non-default VRF to be used for as the next-hop gateway.

*dest-ip-addr*

Specifies the destination IPv4 address and mask in the format A.B.C.D/L (where "L" is the prefix length of the mask).

*next-hop-addr*

Specifies the IPv4 address of the next hop.

**ethernet** *slot/port*

Specifies the destination Ethernet port.

**next-hop-vrf** *next-vrf-name*

VRF name of next hop.

**ve** *vlan-id*

Specifies the outgoing interface type as VE.

**null 0**

Configures the Layer 3 switch to drop IP packets to a specific network or host address by configuring a "null" (sometimes called "null0") static route for the address.

*metric*

Specifies the cost metric of the route. Valid values range from 1 through 16. The default is 1.

**distance** *distance*

Specifies the administrative distance of the route. When comparing otherwise equal routes to a destination, an SLX-OS device prefers lower administrative distances over higher ones. Valid values range from 1 through 254. The default is 1.

**tag** *tag-number*

Specifies the tag value of the route to use for route filtering with a route map. Valid values range from 0 through 4294967295. The default is 0.

## Modes

Global configuration mode

## Usage Guidelines

The **no** form of the command followed by the route identifier removes a static route.

If you do not want to specify a next-hop IP address, you can instead specify a physical or virtual interface on the SLX-OS device. If you specify an Ethernet port, the device forwards packets destined for the static route's destination network to the specified interface. Conceptually, this feature makes the destination network like a directly connected network, associated with an SLX-OS device interface.

The port or virtual interface you use for the static route's next hop must have at least one IP address configured on it. The address does not need to be in the same subnet as the destination network.

For a default route, use the following as the destination IP address 0.0.0.0/0.

You can create a null route for traffic that should not be forwarded. To create a null route, use the key phrase **null 0** as the next hop.

## Examples

The following example configures a static route to 10.95.7.0 addresses, using 10.95.6.157 as the next-hop gateway.

```
device(config)# ip route 10.95.7.0/24 10.95.6.157
```

The following example configures a default route to next-hop IP address 10.24.4.1.

```
device(config)# ip route 0.0.0.0/0 10.24.4.1
```

The following example configures a static route with an Ethernet interface as the destination.

```
device(config)# ip route 192.128.2.69/24 ethernet 4/1
```

The following example configures a null static route to drop packets destined for network 10.157.22.x.

```
device(config)# ip route 10.157.22.0/24 null 0
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ip router-id

Changes the router ID that is already in configured.

## Syntax

```
ip router-id A.B.C.D
```

```
no ip router-id A.B.C.D
```

## Parameters

*A.B.C.D*

Specifies the IPv4 address that you want as the router ID.

## Modes

Global configuration mode

VRF configuration mode

## Usage Guidelines

Though a device has IP addresses assigned to various interfaces, some routing protocols identify the device by the router ID rather than the IP addresses assigned to the interfaces connected by the protocol.

The **no** form of the command removes the configured router ID and restores the default router ID.

## Examples

The following example specifies the router ID as 192.158.1.2.

```
device# configure terminal
device(config)# ip router-id 192.158.1.2
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ip router isis

Enables Intermediate System-to-Intermediate System (IS-IS) routing at the interface level.

## Syntax

```
ip router isis
```

## Command Default

Disabled.

## Modes

Interface subtype configuration mode

## Usage Guidelines

Use the **no** form of this command to disable IS-IS routing for the interface.

## Examples

The following example enables IS-IS routing for an interface Ethernet.

```
device# configure terminal
device(config)# interface ethernet 1/1
device(conf-if-eth-1/1)# ip router isis
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ip vrrp-extended auth-type

Configures the type of authentication used on a Virtual Router Redundancy Protocol Extended (VRRP-E) interface.

## Syntax

```
ip vrrp-extended auth-type md5-auth auth-text  
no ip vrrp-extended auth-type md5-auth
```

## Command Default

No authentication is configured for a VRRP-E interface.

## Parameters

### **auth-type**

Authentication type used to verify the *password*.

### **md5-auth** *auth-text*

Configures MD5 authentication on the interface. The maximum length of the text string is 64 characters.

## Modes

Virtual Ethernet (ve) interface configuration mode

## Usage Guidelines

This configuration is for virtual Ethernet (ve) interfaces only.

If the **md5-auth** option is configured, syslog and SNMP traps are generated if a packet is being dropped due to MD5 authentication failure. Using MD5 authentication implies that the software does not need to run checksum verification on the receiving device and can rely on the authentication code (message digest 5 algorithm) to verify the integrity of the VRRP-E message header.

The **no** form of this command removes the VRRP-E authentication from the interface.

## Examples

The following example configures MD5 authentication on Virtual Ethernet interface 20.

```
device(config)# protocol vrrp-extended  
device(config)# interface ve 20  
device(config-if-Ve-20)# ip vrrp-extended auth-type md5-auth lyk28d3j
```



## History

Release version	Command history
16r.1.00	This command was introduced.

# ipv6 access-list

Creates a standard or extended IPv6 access control list (ACL). In ACLs, you can define rules that permit or deny network traffic based on criteria that you specify.

## Syntax

```
ipv6 access-list { standard | extended } ACLname
no ipv6 access-list { standard | extended } ACLname
```

## Parameters

### standard | extended

Specifies one of the following types of access lists:

#### standard

Contains rules that permit or deny traffic based on source addresses that you specify. The rules are applicable to all ports of the specified addresses.

#### extended

Contains rules that permit or deny traffic according to source and destination addresses, as well as other parameters. For example, you can also filter by port, protocol (TCP or UDP), and TCP flags.

### *ACLname*

Specifies an ACL name unique among all ACLs (Layer 2 and Layer 3). The name can be up to 63 characters in length, and must begin with an alphanumeric character. No special characters are allowed, except for the underscore and hyphen.

## Modes

Global configuration mode

## Usage Guidelines

An ACL name can be up to 63 characters long, and must begin with a-z, A-Z or 0-9. You can also use underscore (\_) or hyphen (-) in an ACL name, but not as the first character.

After you create an ACL, use the **seq** command to create filtering rules for that ACL.

An ACL starts functioning only after it is applied to an interface, using the **access-group** command.

To delete an ACL, use the **no access-list** command. You can delete an ACL only after you first remove it from all interfaces to which it is applied, using the **no access-group** command.

## Examples

The following example creates an IPv6 standard ACL:

```
device# configure
device(config)# ipv6 access-list standard stdV6ACL1
```

The following example creates an IPv6 extended ACL:

```
device# configure
device(config)# ipv6 access-list extended ipv6_acl_1
```

The following example creates rules on an IPv6 standard ACL:

```
device# configure
device(config)# ipv6 access-list standard stdV6ACL1
device(conf-ipv6-std)# seq 10 permit 2001:db8:85a3:0:0:8a2e:370:7334
device(conf-ipv6-std)# seq 11 deny any
```

The following example deletes an IPv6 ACL:

```
device# configure
device(config)# no ipv6 access-list standard stdV6ACL1
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ipv6 address

Configure an IPv6 address for an interface.

## Syntax

```

ipv6 address pv6-prefix/prefix-length [ secondary ] [ anycast | eui-64 ]
no ipv6 address pv6-prefix/prefix-length [ secondary ] [ anycast | eui-64 ]
ipv6 address ipv6-address link-local
no ipv6 address ipv6-address link-local

```

## Parameters

### **ipv6-address**

Specifies the IPv6 address.

### *pv6-prefix*

Specifies the IPv6 prefix address in this format: X:X::X/M.

### *prefix-length*

A decimal value specifying the length of the IPv6 prefix.

### **secondary**

Specifies that the address is a secondary address. A maximum of 256 secondary addresses can be configured.

### **anycast**

Configures an address as an anycast address.

### **eui-64**

Configures the global address with an EUI-64 interface ID in the low-order 64 bits. The interface ID is automatically constructed in IEEE EUI-64 format using the interface's MAC address.

## Modes

Interface configuration mode

## Usage Guidelines

A secondary address cannot be configured on an interface unless the primary address is configured first.

The primary address cannot be deleted on an interface unless the secondary addresses are deleted first.

This command is not supported on loopback or management interfaces.

## Examples

This example shows how to configure a primary, secondary global, or unique local IPv6 unicast address, including a manually configured interface ID:

```
device(config)# configure terminal
device(config)# interface ethernet 3/1
device(conf-if-eth-2/3)# ipv6 address 2001:db8:12d:1300:240z:d0ff:fe48:4672/64
```

This example shows how to remove the IPv6 unicast address, including a manually configured interface ID from an interface:

```
device(conf-if-eth-2/3)# no ipv6 address 2001:db8:12d:1300:240z:d0ff:fe48:4672/64
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ipv6 dhcp relay address

Configures the IPv6 DHCP Relay address on a Layer 3 interface.

## Syntax

**ipv6 dhcp relay address** *ipv6-addr* [**interface** *interface-type interface-name*] [**use-vrf** *vrf-name* ]

**no ipv6 dhcp relay address** *ipv6-addr* [**interface** *interface-type interface-name*] [**use-vrf** *vrf-name* ]

## Parameters

*ipv6-addr*

IPv6 address of the DHCP server where the DHCP client requests are to be forwarded.

**interface**

This parameter specifies the outgoing interface, used when the relay address is a link-local or multicast address

*interface-type*

The type of interface - Ethernet or VE.

*interface-name*

The interface name or Ve ID.

**use-vrf**

Use this option if the VRF where the DHCP server is located is different from the VRF of the interface where the client is connected.

*vrf-name*

VRF name.

## Modes

Interface subtype configuration mode

## Usage Guidelines

This command uses the IPv6 address of the DHCP server where the DHCP client requests are to be forwarded. You can configure the address on a virtual Ethernet (VE) or an Ethernet interface. You can configure up to 16 relay destination addresses on an interface.

Enter the command while in interface subtype configuration mode for a VE or Ethernet interface where you want to configure the IPv6 DHCP Relay. Use the **no** version of this command to remove the IPv6 DHCP Relay from the interface. If the **use-vrf** option is not used, it is assumed that the DHCP server and interface where the client is connected are on the same VRF.

If the relay address is a link local address or a multicast address, an outgoing interface must be configured for IPv6 relay to function. In instances where the server address is relayed to a different VRF compared to a client connected interface VRF, in addition to the relay address, you must also specify the user-vrf, otherwise IPv6 relay may not function correctly. IPv6 route leaking is also required for IPv6 reachability.

The **no** form of the command deletes the IPv6 DHCP Relay address from the interface.

## Examples

To configure an IPv6 DHCP Relay address on a Ve interface:

```
device# config
device(config)# interface ve 100
device(config-Ve-100)# ipv6 dhcp relay address 2001::1122:AABB:CCDD:3344 use-vrf blue
```

To configure an IPv6 DHCP Relay address on an interface:

```
(config)# interface ethernet 2/3
device(conf-if-eth-2/3)# ipv6 dhcp relay address fe80::224:38ff:febb:e3c0 interface ethernet 2/5
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ipv6 dns

Configures the DNS domain name and the primary and secondary name-server IPv6 addresses.

## Syntax

```
ipv6 dns { domain-name domain_name | name-server name_server }
```

```
no ipv6 dns { domain-name domain_name | name-server name_server }
```

## Parameters

**domain-name** *domain\_name*

Specifies the DNS domain name.

**name-server** *name\_server*

Specifies the IPv6 address of the primary and secondary name servers. Both the IPv6 and IPv4 addresses are supported.

## Modes

Global configuration mode

## Usage Guidelines

Your first run of **ipv6 dns name-server** specifies the default IP gateway address. Your second run of **ipv6 dns name-server** specifies the secondary IP gateway address.

Name servers can only be entered or removed one at a time. The newly entered name server will append to the existing name server.

To disable IP directed broadcasts for a specific domain, enter **no ipv6 dns domain-name *domain\_name***.

To delete a name-server definition, enter **no ipv6 dns name-server *ipv6\_address\_of\_name\_server***.

## Examples

The following example configures DNS.

```
device(config)# ipv6 dns domain-name mycompany.com
device(config)# ipv6 dns name-server 2001:db8:12d:1300:240z:d0ff:fe48:4672
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# ipv6 icmpv6 rate-limiting

Limits the rate at which IPv6 Internet Control Message Protocol version 6 (ICMPv6) messages are sent on a network.

## Syntax

```
ipv6 icmpv6 rate-limiting milliseconds
no ipv6 icmpv6 rate-limiting
```

## Command Default

This command is enabled on the management port and on the front-end ports.

## Parameters

*milliseconds*  
Time interval per ICMP packet. The range is from 1 through 4294967295 milliseconds. The default is 1000 milliseconds.

## Modes

Interface configuration mode

## Usage Guidelines

This is an interface-specific configuration.

The **no** form of this command reverts the rate limiting to the default settings.

Set the rate limiting to 0 to disable icmpv6 rate limiting.

## Examples

The following example enables IPv6 ICMP rate-limiting on an Ethernet interface.

```
device(config)# interface ethernet 3/5
device(conf-int-eth-3/5)# ipv6 icmpv6 rate-limiting
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ipv6 mtu

Sets the IPv6 maximum transmission unit (MTU) on a specified interface.

## Syntax

`ipv6 mtu size`

`no ipv6 mtu`

## Command Default

IPv6 MTU size is 1500 bytes.

## Parameters

*size*

Specifies the size of an interface IPv6 MTU. The range is from 1300 through 9216 bytes.

## Modes

Interface configuration mode

## Usage Guidelines

If the interface is part of a VE, change the IPv6 MTU only at the VE interface and not at the physical port. All member ports of a VE inherit the VE-interface IPv6 MTU value.

Use the **no ipv6 mtu** command to revert the IPv6 MTU size to the default value.

## Examples

On a specified Ethernet interface, the following example sets the IPv6 MTU to 2000 bytes.

```
device# configure terminal
device(config)# interface ethernet 2/9
device(conf-if-eth-2/9)# ipv6 mtu 2000
```

The following example changes the IPv6 MTU for a VE.

## History

Release version	Command history
16r.1.00	This command was introduced.

# ipv6 ospf active

Sets a specific OSPFv3 interface to active.

## Syntax

```
ipv6 ospf active
```

## Modes

Interface subtype configuration mode

## Usage Guidelines

Use the **ipv6 ospf active** command on each interface participating in adjacency formation. This command overrides the global passive setting on that interface, and enables transmission of OSPFv3 control packets.

## Examples

The following example sets a specific OSPFv3 Ethernet interface to active.

```
device# configure terminal
device(config)# interface ethernet 1/1
device(conf-if-eth-1/1)# ipv6 ospf active
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ipv6 ospf area

Enables OSPFv3 on an interface.

## Syntax

```
ipv6 ospf area area-id | ip-addr
```

```
no ipv6 ospf area
```

## Command Default

OSPFv3 is disabled.

## Parameters

*area-id*

Area ID in dotted decimal or decimal format.

*ip-addr*

Area ID in IP address format.

## Modes

Interface subtype configuration mode

## Usage Guidelines

This command enables an OSPFv3 area on the interface to which you are connected.

The **no** form of the command disables OSPFv3 on this interface.

## Examples

The following example enables a configured OSPFv3 area named 0 on a specific OSPFv3 Loopback interface.

```
device# configure terminal
device(config)# interface loopback 1
device(config-Loopback-1)# ipv6 ospf area 0
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ipv6 ospf authentication ipsec

Specifies IP security (IPsec) as the authentication type for an OSPFv3 interface.

## Syntax

```
ipv6 ospf authentication ipsec key-add-remove-interval interval
```

```
no ipv6 ospf authentication ipsec key-add-remove-interval interval
```

## Command Default

Disabled.

## Parameters

**key-add-remove-interval** *interval*

Specifies the OSPFv3 authentication key add-remove interval. Valid values range from decimal numbers 0 through 14400. The default is 300.

## Modes

Interface subtype configuration mode

## Usage Guidelines

The **no** form of the command removes IPsec authentication from the interface.

## Examples

The following example enables IPsec on a specified OSPFv3 Loopback interface.

```
device# configure terminal
device(config)# interface loopback 1
device(config-Loopback-1)# ipv6 ospf area 0
device(config-Loopback-1)# ipv6 ospf authentication ipsec
```

The following example sets the OSPFv3 authentication key add-remove interval to 480.

```
device# configure terminal
device(config)# interface loopback 1
device(config-Loopback-1)# ipv6 ospf area 0
device(config-Loopback-1)# ipv6 ospf authentication ipsec key-add-remove-interval 480
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ipv6 ospf authentication ipsec disable

Disables IP security (IPsec) services on an OSPFv3 interface.

## Syntax

```
ipv6 ospf authentication ipsec disable
no ipv6 ospf authentication ipsec disable
```

## Command Default

Authentication is disabled.

## Modes

Interface subtype configuration mode

## Usage Guidelines

Use this command to disable IPsec if it is enabled on the interface. Packets that are sent out will not be IPsec encapsulated and the received packets which are IPsec encapsulated will be dropped.

The **no** form of the command re-enables IPsec on the interface if IPsec is already configured on the interface.

## Examples

The following example disables IPsec on a specific OSPFv3 interface where IPsec is already enabled.

```
device# configure terminal
device(config)# interface loopback 1
device(config-Loopback-1)# ipv6 ospf authentication ipsec disable
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ipv6 ospf authentication spi

Specifies the security policy index (SPI) value for an OSPFv3 interface.

## Syntax

```
ipv6 ospf authentication spi spi { ah | esp null } { hmac-md5 | hmac-sha1 } key key }
no ipv6 ospf authentication spi
```

## Command Default

Disabled.

## Parameters

*spi*

SPI value. Valid values range from decimal numbers 512 through 4294967295.

**ah**

Specifies Authentication Header (ah) as the protocol to provide packet-level security.

**esp**

Specifies Encapsulating Security Payload (ESP) as the protocol to provide packet-level security.

**null**

Specifies that the ESP payload is not encrypted.

**hmac-md5**

Enables Hashed Message Authentication Code (HMAC) Message Digest 5 (MD5) authentication on the OSPFv3 interface.

**hmac-sha1**

Enables HMAC Secure Hash Algorithm 1 (SHA-1) authentication on the OSPFv3 interface.

**key**

Number used in the calculation of the message digest.

*key*

The 40 hexadecimal character key.

## Modes

Interface subtype configuration mode

## Usage Guidelines

Enter **no ipv6 ospf authentication spi *spi*** to remove the SPI value from the interface.

## Examples

The following example enables ESP and HMAC-SHA-1 on a specified OSPFv3 Ethernet interface.

```
device# configure terminal
device(config)# interface ethernet 1/1
device(config-if-eth-1/1)# ipv6 ospf area 0
device(config-if-eth-1/1)# ipv6 ospf authentication spi 512 esp null hmac-sha1 key
abcef12345678901234fedcba098765432109876
```

The following example enables HA and HMAC-MD5 on a specified OSPFv3 virtual Ethernet (VE) interface.

```
device# configure terminal
device(config)# interface ve 1
device(config-if-ve-1)# ipv6 ospf area 0
device(config-if-ve-1)# ipv6 ospf authentication spi 750 ha hmac-md5 key
abcef12345678901234fedcba098765432109876
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# ipv6 ospf bfd

Enables Bidirectional Forwarding Detection (BFD) on a specific OSPFv3 interface.

## Syntax

```
ipv6 ospf bfd
```

```
no ipv6 ospf bfd
```

## Modes

Interface subtype configuration mode

## Usage Guidelines

BFD sessions are initiated only if BFD is also enabled globally using the **bfd** command in OSPFv3 router configuration mode. If BFD is disabled using the **no bfd** command in OSPFv3 router configuration mode, BFD sessions on specific interfaces are deregistered.

The **no** form of the command removes all BFD sessions from a specified interface.

## Examples

The following example enables BFD on an Ethernet interface.

```
device# configure terminal
device(config)# interface ethernet 1/4
device(config-if-eth-1/4)# ipv6 ospf bfd
```

The following example disables BFD on an OSPFv3 virtual Ethernet (VE) interface.

```
device# configure terminal
device(config)# interface ve 24
device(config-if-Ve-24)# no ipv6 ospf bfd
```

## History

Release version	Command history
17r.1.01	This command was introduced.

# ipv6 ospf cost

Configures cost for a specific OSPFv3 interface.

## Syntax

```
ipv6 ospf cost value
```

```
no ipv6 ospf cost
```

## Command Default

Cost value is 1.

## Parameters

*value*

Cost value. Valid values range from 1 through 65535. The default is 1.

## Modes

Interface subtype configuration mode

## Usage Guidelines

Use this command to set or reset the OSPFv3 cost on the interface. If the cost is not configured with this command, OSPFv3 calculates the value from the reference and interface bandwidths.

For more information, refer to the **auto-cost reference-bandwidth** command.

The **no** form of the command disables the configured cost.

## Examples

The following example sets the cost to 620 on a specific OSPFv3 Virtual Ethernet (VE) interface.

```
device# configure terminal
device(config)# interface ve 1
device(config-if-Ve-1)# ipv6 ospf cost 620
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ipv6 ospf dead-interval

Specifies the time period for which a neighbor router waits for a hello packet from the device before declaring the router down.

## Syntax

```
ipv6 ospf dead-interval interval
no ipv6 ospf dead-interval
```

## Command Default

The specified time period is 40 seconds.

## Parameters

*interval*

Dead interval in seconds. Valid values range from 3 through 65535 seconds. The default is 40.

## Modes

Interface subtype configuration mode

## Usage Guidelines

If you change the dead interval, the hello interval is automatically changed to a value that is one fourth that of the new dead interval, unless the hello interval is also explicitly configured using the **ipv6 ospf hello-interval** command.

The recommended setting is that:

- The dead interval is four times that of the hello interval.
- The hello interval is  $\frac{1}{4}$  times that of the dead interval.

The **running-config** command displays only explicitly configured values of the hello interval, which means that a value that was automatically changed as the result of a dead-interval change is not displayed.

The **no** form of the command restores the default value.

## Examples

The following example sets the dead interval to 80 on a specific OSPFv3 Ethernet interface.

```
device# configure terminal
device(config)# interface ethernet 1/1
device(conf-if-eth-1/1)# ipv6 ospf dead-interval 80
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ipv6 ospf hello-interval

Sets the length of time between the transmission of hello packets that an interface sends to neighbor routers.

## Syntax

```
ipv6 ospf hello-interval interval  
no ipv6 ospf hello-interval
```

## Command Default

The length of time between the transmission of hello packets is set to 10 seconds.

## Parameters

*interval*

Hello interval in seconds. Valid values range from 1 through 65535 seconds. The default is 10.

## Modes

Interface subtype configuration mode

## Usage Guidelines

If you change the hello interval, the dead interval is automatically changed to a value that is four times that of the new hello interval, unless the dead interval is also explicitly configured using the **ipv6 ospf dead-interval** command.

The recommended setting is that:

- The dead interval is four times that of the hello interval.
- The hello interval is  $\frac{1}{4}$  times that of the dead interval.

The **running-config** command displays only explicitly configured values of the dead interval, which means that a value that was automatically changed as the result of a hello interval change is not displayed.

The **no** form of the command restores the default value.

## Examples

The following example sets the hello interval to 20 on a specific OSPFv3 Ethernet interface.

```
device# configure terminal  
device(config)# interface ethernet 1/1  
device(conf-if-eth-1/1)# ipv6 ospf hello-interval 20
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ipv6 ospf hello-jitter

Sets the allowed jitter between HELLO packets.

## Syntax

```
ipv6 ospf hello-jitter interval
no ipv6 ospf hello-jitter
```

## Command Default

10%

## Parameters

*jitter*

Allowed interval between hello packets.Valid values range from 1 through 50 percent (%).

## Modes

Interface subtype configuration mode

## Usage Guidelines

The hello interval can vary from the configured hello-interval to a maximum of percentage value of configured jitter.

## Examples

The following example sets the hello jitter to 20 on a specific OSPFv3 Ethernet interface.

```
device# configure terminal
device(config)# interface ethernet 1/1
device(conf-if-eth-1/1)# ipv6 ospf hello-jitter 20
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ipv6 ospf instance

Specifies the number of OSPFv3 instances running on an interface.

## Syntax

```
ipv6 ospf instance instanceID
```

```
no ipv6 ospf instance
```

## Parameters

*instanceID*

Instance identification number. Valid values range from 0 through 255.

## Modes

Interface subtype configuration mode

## Usage Guidelines

The **no** form of the command restores the default value.

## Examples

The following example sets the number of IPv6 OSPF instances to 35 on a specific Ethernet interface.

```
device# configure terminal
device(config)# interface ethernet 1/1
device(conf-if-eth-1/1)# ipv6 ospf instance 35
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ipv6 ospf mtu-ignore

Enables or disables maximum transmission unit (MTU) match checking.

## Syntax

```
ipv6 ospf mtu-ignore
no ipv6 ospf mtu-ignore
```

## Command Default

Enabled.

## Modes

Interface subtype configuration mode

## Usage Guidelines

In default operation, the IP MTU on both sides of an OSPFv3 link must be the same, and a check of the MTU is performed when Hello packets are first exchanged.

The **no** form of the command disables MTU-match checking on a specific interface.

## Examples

The following example disables MTU-match checking on a specific OSPFv3 Ethernet interface.

```
device# configure terminal
device(config)# interface ethernet 1/1
device(conf-if-eth-1/1)# no ipv6 ospf mtu-ignore
```

The following example enables MTU-match checking on a specific OSPFv3 Ethernet interface.

```
device# configure terminal
device(config)# interface ethernet 1/1
device(conf-if-eth-1/1)# ipv6 ospf mtu-ignore
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# ipv6 ospf network

Configures network type.

## Syntax

```
ipv6 ospf network { broadcast | point-to-point }  
no ipv6 ospf network
```

## Command Default

Network type is broadcast.

## Parameters

### broadcast

Network type is broadcast, such as Ethernet.

### point-to-point

Network type is point-to-point.

## Modes

Interface subtype configuration mode

## Usage Guidelines

Point-to-point can support unnumbered links, which requires less processing by OSPFv3.

The **no** form of the command removes the network-type configuration.

### NOTE

The network type non-broadcast is not supported at this time.

## Examples

The following example configures an OSPFv3 point-to-point link on a specific OSPFv3 Ethernet interface.

```
device# configure terminal  
device(config)# interface ethernet 1/1  
device(conf-if-eth-1/1)# ipv6 ospf network point-to-point
```

The following example configures an OSPFv3 broadcast link on a specific OSPFv3 Loopback interface.

```
device# configure terminal  
device(config)# interface loopback 1  
device(config-loopback-1)# ipv6 ospf network broadcast
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ipv6 ospf passive

Sets a specific OSPFv3 interface to passive.

## Syntax

```
ipv6 ospf passive
no ipv6 ospf passive
```

## Modes

Interface subtype configuration mode

## Usage Guidelines

The **ipv6 ospf passive** command disables transmission of OSPFv3 control packets on that interface. OSPFv3 control packets received on a passive interface are discarded.

The **no** form of the command sets an interface back to active.

## Examples

The following example sets a specific OSPFv3 virtual Ethernet (VE) interface to passive.

```
device# configure terminal
device(config)# interface ve 1
device(config-if-Ve-1)# ipv6 ospf passive
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ipv6 ospf priority

Configures priority for designated router (DR) election and backup designated routers (BDRs) on the interface you are connected to.

## Syntax

```
ipv6 ospf priority value
no ipv6 ospf priority
```

## Command Default

The value is set to 1.

## Parameters

*value*  
Priority value. Valid values range from 0 through 255. The default is 1.

## Modes

Interface subtype configuration mode

## Usage Guidelines

The OSPFv3 router assigned the highest priority becomes the designated router, and the OSPFv3 router with the second-highest priority becomes the backup router.

The **no** form of the command restores the default value.

## Examples

The following example sets a priority of 4 for the OSPFv3 router that is connected to an OSPFv3 Virtual Ethernet (VE) interface.

```
device# configure terminal
device(config)# interface ve 1
device(config-if-Ve-1)# ipv6 ospf priority 4
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ipv6 ospf retransmit-interval

Configures the retransmit interval. The retransmit interval is the time between Link-State Advertisement (LSA) retransmissions to adjacent routers for a given interface.

## Syntax

```
ipv6 ospf retransmit-interval interval
no ipv6 ospf retransmit-interval
```

## Command Default

The interval is 5 seconds.

## Parameters

*interval*

Retransmit interval in seconds. Valid values range from 0 through 3600 seconds. The default is 5.

## Modes

Interface subtype configuration mode

## Usage Guidelines

The **no** form of the command resets the retransmit interval to its default.

## Examples

The following example sets the retransmit interval to 8 for all OSPFv3 devices on a specific OSPFv3 Ethernet interface.

```
device# configure terminal
device(config)# interface ethernet 1/1
device(conf-if-eth-1/1)# ipv6 ospf retransmit-interval 8
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ipv6 ospf suppress-linklsa

Suppresses link LSA advertisements.

## Syntax

```
ipv6 ospf suppress-linklsa
no ipv6 ospf suppress-linklsa
```

## Modes

Interface subtype configuration mode

## Usage Guidelines

The **no** form of the command restores the defaults where link LSA advertisements are not suppressed.

## Examples

The following example suppresses link LSAs from being advertised on devices on a specific OSPFv3 Ethernet interface.

```
device# configure terminal
device(config)# interface ethernet 1/1
device(conf-if-eth-1/1)# ipv6 ospf suppress-linklsa
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ipv6 ospf transmit-delay

Configures transmit delay for link-update packets. The transmit delay is the estimated time required for OSPFv3 to send link-state update packets on the interface to which you are connected.

## Syntax

```
ipv6 ospf transmit-delay value
```

```
no ipv6 ospf transmit-delay
```

## Command Default

The transmit delay is set to 1 second.

## Parameters

*value*

Transmit delay in seconds. Valid values range from 0 through 3600 seconds.

## Modes

Interface subtype configuration mode

## Usage Guidelines

The **no** form of the command restores the default value.

## Examples

The following example sets a transmit delay of 25 seconds for devices on a specific OSPFv3 Ethernet interface.

```
device# configure terminal
device(config)# interface ethernet 1/1
device(conf-if-eth-1/1)# ipv6 ospf transmit-delay 25
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ipv6 policy route-map

Enables IPv6 policy-based routing (PBR).

## Syntax

```
ipv6 policy route-map map-name
no ipv6 policy route-map map-name
```

## Command Default

IPv6 PBR is not enabled.

## Parameters

*map-name*  
Specifies the name of the route map.

## Modes

Interface configuration mode  
Virtual interface configuration mode

## Usage Guidelines

The **no** form of the command disables IPv6 PBR.

## Examples

The following example enables PBR on a specific interface.

```
device(config)# route-map test-route permit 99
device(config-route-map-test-route/permit/99)# match ipv6 address acl 99
device(config-route-map-test-route/permit/99)# set ipv6 next-hop 2001:db8:0:0:0:ff00:42:8329
device(config-route-map-test-route/permit/99)# exit
device(config)# interface ethernet 1/1
device(conf-if-eth-1/1)# ipv6 policy route-map test-route
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# ipv6 prefix-list

Configures an IPv6 prefix list for basic traffic filtering

## Syntax

```

ipv6 prefix-list name deny ipv6-prefix/prefix-length [ ge ge-value ] [ le le-value ]
ipv6 prefix-list name permit ipv6-prefix/prefix-length [ ge ge-value ] [ le le-value ]
ipv6 prefix-list name seq instance-number { deny ge ge-value le le-value | permit ge ge-value le le-value }
no ipv6 prefix-list name

```

## Parameters

*name*

Specifies the prefix list name.

**deny** *ip-prefix/prefix-length*

Denies a route specified in the prefix list. The prefix list matches only on the specified prefix/prefix length, unless you use the **ge** *ge-value* or **le** *le-value* parameters.

**ge** *ge-value*

Specifies minimum prefix length to be matched. The range is from *ge-value* to 128.

**le** *le-value*

Specifies maximum prefix length to be matched. The range is from the *le-value* to the *prefix-length* parameter.

**permit** *ip-prefix/prefix-length*

Permits a route specified in the prefix list. The prefix list matches only on the specified prefix/prefix length, unless you use the **ge** *ge-value* or **le** *le-value* parameters.

**seq**

Specifies an IPv6 prefix list sequence number of entry.

*instance*

Specifies an IPv6 prefix list instance number.

## Modes

Global configuration mode

## Usage Guidelines

An IPv6 prefix list is composed of one or more conditional statements that execute a permit or deny action if a route matches a specified prefix. In prefix lists with multiple statements, you can specify a sequence number for each statement. The specified sequence number determines the order in which the statement appears in the prefix.

You can configure an IPv6 prefix list on a global basis, then use it as input to other commands or processes, such as route aggregation, route redistribution, route distribution, route maps, and so on. When an SLX-OS device interface sends or receives an IPv6 packet, it applies the statements within the IPv6 prefix list in their order of appearance to the packet. As soon as a match occurs, the device takes the specified action (permit or deny the packet) and stops further comparison for that packet.

You can use permit statements in the prefix list to specify the traffic that you want to send to the other feature. If you use deny statements, the traffic specified by the deny statements is not supplied to the other feature. You can configure up to one hundred IPv6 prefix lists.

You must specify the `ipv6-prefix` parameter in hexadecimal using 16-bit values between colons as documented in RFC 4291. You must specify the `prefix-length` parameter as a decimal value. A slash mark (/) must follow the `ipv6-prefix` parameter and precede the `prefix-length` parameter.

The *ge-value* or *le-value* you specify must meet the following condition for *prefix-length*:

```
ge-value <= le-value <= 128
```

## Examples

The following example creates a prefix-list that allows routes with the prefix 2001:db8::/32 .

```
device# configure terminal
device(config)# ipv6 prefix-list route1 permit 2001:db8::/32
device(config)# interface ethernet 2/1
device(conf-if-eth-2/1)# ipv6 prefix-list route1
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ipv6 protocol vrrp

Globally enables IPv6 VRRPv3.

## Syntax

```
ipv6 protocol vrrp
```

```
no ipv6 protocol vrrp
```

## Command Default

IPv6 VRRPv3 is not enabled.

## Modes

Global configuration mode

## Usage Guidelines

The **no** form of this command globally disables VRRPv3.

## Examples

To enable IPv6 VRRPv3 globally:

```
device# configure terminal
device(config)# ipv6 protocol vrrp
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ipv6 protocol vrrp-extended

Globally enables IPv6 VRRP-Ev3.

## Syntax

```
ipv6 protocol vrrp-extended
```

```
no ipv6 protocol vrrp-extended
```

## Command Default

IPv6 VRRP-Ev3 is disabled.

## Modes

Global configuration mode

## Usage Guidelines

The **no** form of this command globally disables IPv6 VRRP-Ev3.

## Examples

To enable IPv6 VRRP-Ev3 globally:

```
device# configure terminal
device(config)# ipv6 protocol vrrp-extended
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ipv6 receive access-group

Applies an IPv6 access control list (ACL) at global configuration level. Such *receive-path* ACLs filter incoming route-processor traffic according to rules that you create, but do not filter data-path traffic.

## Syntax

```
ipv6 receive access-group acl-name  
no ipv6 receive access-group acl-name
```

## Command Default

No receive-path ACLs are applied.

## Parameters

*acl-name*  
Specifies the name of the standard or extended IP access list.

## Modes

Global configuration mode

## Usage Guidelines

For both interface ACLs and receive-path ACLs, you use identical commands to create the ACLs. You also use identical commands to define permit/deny rules in the ACLs. The only variance is the command you use to apply the ACL:

- To apply an interface ACL, from an interface-subtype configuration mode you use the { **ip** | **ipv6** | **mac** } **access-group** command.
- To apply a receive-path ACL, from global configuration mode you use the { **ip** | **ipv6** | **mac** } **receive access-group** command.

You can apply a maximum of two receive-path ACLs to a device, as follows:

- One IPv4 receive-path ACL
- One IPv6 receive-path ACL

To remove a receive-path ACL, enter the **no** form of this command.

## Examples

The following example creates an IPv6 extended ACL, defines rules in the ACL, and applies it as a receive-path ACL.

```

device(config)# ipv6 access-list extended ipv6-receive-acl-example
device(conf-ipacl-ext)# hard-drop tcp host 10::1 any count
device(conf-ipacl-ext)# hard-drop udp any host 20::1 count
device(conf-ipacl-ext)# permit tcp host 10::2 any eq telnet count
device(conf-ipacl-ext)# permit tcp host 10::2 any eq bgp count

device(conf-ipacl-ext)# exit
device(config)# ipv6 receive access-group ipv6-receive-acl-example
    
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ipv6 route

Configures an IPv6 static route.

## Syntax

```
ipv6 route dest-ipv6-prefix/prefix-length next-hop-ipv6-address [ metric ] [ distance number ] [ tag tag-number ]
```

```
ipv6 route dest-ipv6-prefix/prefix-length link-local-next-hop-ipv6-address [ ve ve-id ] [ metric ] [ distance number ] [ tag tag-number ]
```

```
ipv6 route dest-ipv6-prefix/prefix-length link-local-next-hop-ipv6-address [ ethernet slot/port ] [ metric ] [ distance number ] [ tag tag-number ]
```

```
no ipv6 route dest-ipv6-prefix/prefix-length next-hop-ipv6-address
```

```
no ipv6 route dest-ipv6-prefix/prefix-length link-local-next-hop-ipv6-address [ ve ve-id ]
```

```
no ipv6 route dest-ipv6-prefix/prefix-length link-local-next-hop-ipv6-address [ ethernet slot/port ]
```

## Command Default

No IPv6 static route is configured by default.

## Parameters

*dest-ipv6-prefix*

Destination IPv6 prefix in hexadecimal with 16-bit values between colons, as specified in RFC 2373.

*prefix-length*

A decimal value specifying the length of the IPv6 address prefix.

*next-hop-ipv6-address*

IPv6 address of the next-hop gateway.

*link-local-next-hop-ipv6-address*

IPv6 address of the link-local next-hop gateway.

**ethernet** *slot/port*

Specifies the Ethernet slot and port.

**ve** *ve-id*

Specifies the virtual Ethernet (VE) interface.

*metric*

Specifies a value that the Layer 3 switch uses to compare this route to other static routes in the IPv6 static route table that have the same destination. The metric applies only to routes that the Layer 3 switch has already placed in the IPv6 static route table. Two or more routes to the same destination with the same metric will load share (as in ECMP load sharing). The range is from 1 through 16. The default is 1.

**distance** *number*

Specifies an administrative distance. The range is from 1 through 254. The default is 1. This is a value that the Layer 3 switch uses to compare this route with routes from other route sources that have the same destination. By default, static routes take precedence over routes learned by routing protocols. To choose a dynamic route over a static route,

configure the static route with a higher administrative distance than the dynamic route. A distance of 255 is considered unreachable.

**tag**

Specifies a tag value for the route. The route tag can be used for route redistribution to routing protocols by means of route maps (as in IPv4 static route redistribution).

*tag-number*

A number from 0 through 4294967295. The default is 0.

## Modes

Global configuration mode

VRF configuration mode

## Usage Guidelines

Use the **no** form of the command with the same parameters to remove the IPv6 static route.

## Examples

The following example creates an IPv6 static route for a destination network with the prefix 2001:DB8::0/32 and a next-hop gateway with the global address 2001:DB8:0:ee44::1.

```
device# configure terminal
device(config)# ipv6 route 2001:DB8::0/32 2001:DB8:0:ee44::1
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# ipv6 route next-hop-vrf

Configures an IPv6 static route through a named VRF.

## Syntax

```
ipv6 route ipv6-prefix/prefix-length next-hop-vrf vrf_name next-hop-ipv6-address [metric] [distance number] [tag tag-number]
```

```
no ipv6 route ipv6-prefix/prefix-length next-hop-vrf vrf_name next-hop-ipv6-address
```

## Command Default

No IPv6 static route is configured by default.

## Parameters

*dest-ipv6-prefix*

Destination IPv6 prefix in hexadecimal with 16-bit values between colons, as specified in RFC 2373.

*prefix-length*

A decimal value specifying the length of the IPv6 address prefix.

*next-hop-ipv6-address*

IPv6 address of the next-hop gateway.

**next-hop-vrf** *vrf\_name* *next-hop-ipv6-address*

Specifies a VRF instance and a next-hop IPv6 address.

*metric*

Specifies a value that the Layer 3 switch uses to compare this route to other static routes in the IPv6 static route table that have the same destination. The metric applies only to routes that the Layer 3 switch has already placed in the IPv6 static route table. Two or more routes to the same destination with the same metric will load share (as in ECMP load sharing). The range is from 1 through 16. The default is 1.

**distance** *number*

Specifies an administrative distance. The range is from 1 through 254. The default is 1. This is a value that the Layer 3 switch uses to compare this route with routes from other route sources that have the same destination. By default, static routes take precedence over routes learned by routing protocols. To choose a dynamic route over a static route, configure the static route with a higher administrative distance than the dynamic route. A distance of 255 is considered unreachable.

**tag**

Specifies a tag value for the route. The route tag can be used for route redistribution to routing protocols by means of route maps (as in IPv4 static route redistribution).

*tag-number*

A number from 0 through 4294967295. The default is 0.

## Modes

Global configuration mode

VRF configuration mode

## Usage Guidelines

Use the **no** form of the command with the same parameters to remove the IPv6 static route.

Related commands:

- **ipv6 route**
- **ipv6 route null**

## Examples

The following example creates an IPv6 static route to IPv6 2001:DB8::0/32 destinations through the VRF named "partners" and the next-hop router with the IPv6 address 2001:DB8:0:ee44::1.

```
device# configure terminal
device(config)# ipv6 route 2001:DB8::0/32 next-hop-vrf partners 2001:DB8:0:ee44::1
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ipv6 route null

Configures an IPv6 null route for discarding traffic.

## Syntax

```
ipv6 route dest-ipv6-prefix/prefix-length null 0 [ metric ] [ distance number ] [ tag tag-number ]
no ipv6 route dest-ipv6-prefix/prefix-length null 0
```

## Command Default

No IPv6 static route is configured by default.

## Parameters

*dest-ipv6-prefix*

Destination IPv6 prefix in hexadecimal with 16-bit values between colons, as specified in RFC 2373.

*prefix-length*

A decimal value specifying the length of the IPv6 address prefix.

*next-hop-ipv6-address*

IPv6 address of the next-hop gateway.

**null 0**

Causes packets to the selected destination to be dropped by shunting them to the "null 0" interface. (This is the only available option.)

**ethernet** *slot/port*

Specifies the Ethernet slot and port.

*metric*

Specifies a value that the Layer 3 switch uses to compare this route to other static routes in the IPv6 static route table that have the same destination. The metric applies only to routes that the Layer 3 switch has already placed in the IPv6 static route table. Two or more routes to the same destination with the same metric will load share (as in ECMP load sharing). The range is from 1 through 16. The default is 1.

**distance** *number*

Specifies an administrative distance. The range is from 1 through 254. The default is 1. This is a value that the Layer 3 switch uses to compare this route with routes from other route sources that have the same destination. By default, static routes take precedence over routes learned by routing protocols. To choose a dynamic route over a static route, configure the static route with a higher administrative distance than the dynamic route. A distance of 255 is considered unreachable.

**tag**

Specifies a tag value for the route. The route tag can be used for route redistribution to routing protocols by means of route maps (as in IPv4 static route redistribution).

*tag-number*

A number from 0 through 4294967295. The default is 0.

## Modes

Global configuration mode

VRF configuration mode

## Usage Guidelines

Use the **no** form of the command with the same parameters to remove the null route.

Related commands:

- **ipv6 route**
- **ipv6 route next-hop-vrf**

## Examples

The following example creates a primary route to all 2001 : DB8 : : 0/32 destinations through virtual interface (ve) 3. The primary route has the default cost metric of 1. The example also creates an alternative null route (with a cost metric of 2) to drop packets when the primary route is not available.

```
device# configure terminal
device(config)# ipv6 route 2001 : DB8 : : 0/32 fe80::1 ve 3
device(config)# ipv6 route 2001 : DB8 : : 0/32 null 0 2
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ipv6 router isis

Enables Intermediate System-to-Intermediate System (IS-IS) routing at the interface level.

## Syntax

```
ipv6 router isis
```

## Command Default

Disabled.

## Modes

Interface subtype configuration mode

## Usage Guidelines

The **no** form of the command disables IS-IS routing for the interface.

## Examples

The following example enables IS-IS routing for an Ethernet interface.

```
device# configure terminal
device(config)# interface ethernet 1/1
device(conf-if-eth-1/1)# ipv6 router isis
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ipv6 router ospf

Enables and configures the Open Shortest Path First version 3 (OSPFv3) routing protocol.

## Syntax

```
ipv6 router ospf [ vrf name ]
no ipv6 router ospf
```

## Command Default

Disabled.

## Parameters

**vrf *name***  
Specifies a nondefault VRF.

## Modes

Global configuration mode

## Usage Guidelines

If you save the configuration to the startup-config file after disabling OSPFv3, all OSPFv3 configuration information is removed from the startup-config file.

Use this command to enable the OSPFv3 routing protocol and enter OSPFv3 router or OSPFv3 router VRF configuration mode. OSPFv3 maintains multiple instances of the routing protocol to exchange route information among various VRF instances.

The **no** form of the command deletes all current OSPFv3 configurations and blocks any further OSPFv3 configuration.

## Examples

The following example enables OSPFv3 on a default VRF and enters OSPFv3 router configuration mode.

```
device# configure terminal
device(config)# ipv6 router ospf
device(config-ipv6-router-ospf-vrf-default-vrf)#
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ipv6 vrrp-extended auth-type

Configures the type of authentication used on a Virtual Router Redundancy Protocol Extended (VRRP-E) interface.

## Syntax

```
ipv6 vrrp-extended auth-type md5-auth auth-text
no ipv6 vrrp-extended auth-type md5-auth
```

## Command Default

No authentication is configured for a VRRP-E interface.

## Parameters

**md5-auth** *auth-text*  
Configures MD5 authentication on the interface. The maximum length of the text string is 64 characters.

## Modes

Virtual Ethernet (ve) interface configuration mode

## Usage Guidelines

This configuration is for virtual Ethernet (ve) interfaces only.

If the **md5-auth** option is configured, syslog and SNMP traps are generated if a packet is being dropped due to MD5 authentication failure. Using MD5 authentication implies that the software does not need to run checksum verification on the receiving device and can rely on the authentication code (message digest 5 algorithm) to verify the integrity of the VRRP-E message header.

The **no** form of this command removes the VRRP-E authentication from the interface.

## Examples

The following example configures MD5 authentication on Virtual Ethernet interface 20.

```
device(config)# ipv6 protocol vrrp-extended
device(config)# interface ve 20
device(config-if-Ve-20)# ipv6 vrrp-extended auth-type md5-auth lyk28d3j
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ipv6 vrrp-extended-group

Configures an IPv6 VRRP-Ev3 group and enters into the VRRP-E configuration mode.

## Syntax

```
ipv6 vrrp-extended-group group-ID
no ipv6 vrrp-extended-group group-ID
```

## Parameters

*group-ID*  
A number from 1 through 255 that you assign to the VRRP-Ev3 group.

## Modes

Virtual Ethernet (VE) interface configuration mode

## Usage Guidelines

Enter **no ipv6 vrrp-extended-group *group-ID*** to remove the specific IPv6 VRRP-Ev3 group. If you remove a group, you cannot retrieve it. You would have to redo the configuration procedure.

This configuration is for virtual Ethernet (VE) interfaces only. IPv6 VRRP-Ev3 must be enabled on the device before the IPv6 VRRP-E group is configured.

## Examples

The following example shows how to assign the VE interface with a VLAN number of 2019 to the VRRP-Ev3 group with the ID of 19.

```
device# configure terminal
device(config)# ipv6 protocol vrrp-extended
device(config)# interface ve 2019
device(config-Ve-2019)# ipv6 address 2001:2019:8192::122/64
device(config-Ve-2019)# ipv6 vrrp-extended-group 19
device(config-vrrp-extended-group-19)#
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# ipv6 vrrp-group

Configures an IPv6 VRRPv3 group and enters into the virtual router configuration mode.

## Syntax

```
ipv6 vrrp-group group-ID
```

```
no ipv6 vrrp-group group-ID
```

## Parameters

*group-ID*

A value from 1 through 255 that you assign to the VRRPv3 group.

## Modes

Interface subtype configuration mode

## Usage Guidelines

Enter **no ipv6 vrrp-group group-ID** to remove a specific IPv6 VRRPv3 group. If you remove a group, you cannot retrieve it. You would have to redo the configuration procedure.

IPv6 VRRPv3 must be enabled on the device before the IPv6 VRRP group is configured.

## Examples

The following example shows how to assign an Ethernet interface to the VRRPv3 group with the ID of 18.

```
device# configure terminal
device(config)# ipv6 protocol vrrp
device(config)# interface ethernet 1/6
device(config-if-eth-1/6)# ipv6 address 2001:2019:8192::125/64
device(config-if-eth-1/6)# ipv6 vrrp-group 18
device(config-vrrp-group-18)#
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ipv6 vrrp-suppress-interface-ra

Suppresses interface router advertisement (RA) when VRRPv3 is configured on an interface.

## Syntax

```
ipv6 vrrp-suppress-interface-ra
no ipv6 vrrp-suppress-interface-ra
```

## Command Default

Interface RA is enabled.

## Modes

Interface subtype configuration mode

## Usage Guidelines

Enter **no ipv6 vrrp-suppress-interface-ra** to remove the suppression of interface RA.

Router advertisements are sent by the VRRP master device and contain the link-local virtual IP address and the virtual MAC address. For network security reasons, if you do not want the MAC addresses of interfaces to be viewed, you can disable RA messages.

## Examples

This example suppresses interface RA on a virtual Ethernet (VE) interface:

```
device# configure terminal
device(config)# ipv6 protocol vrrp
device(config)# interface ve 2019
device(config-Ve-2019)# ipv6 vrrp-suppress-interface-ra
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# isis auth-check

Enables authentication checking for an IS-IS interface.

## Syntax

```
isis auth-check { level-1 | level-2 } disable  
no isis auth-check { level-1 | level-2 } disable
```

## Command Default

IS-IS authentication checking is enabled by default.

## Parameters

**level-1**  
Specifies Level 1 packets.

**level-2**  
Specifies Level 2 packets.

**disable**  
Disables authentication checking.

## Modes

Interface subtype configuration mode

## Usage Guidelines

no

## Examples

The following example disables IS-IS authentication checking for Level 1 packets for an IS-IS Ethernet interface.

```
device# configure terminal  
device(config)# interface ethernet 1/1  
device(conf-if-eth-1/1)# isis auth-check disable
```

The following example re-enables IS-IS authentication checking for Level 2 packets for an IS-IS loopback interface.

```
device# configure terminal  
device(config)# interface loopback 1  
device(config-loopback-1)# isis auth-check
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# isis auth-key

Configures an authentication key for a specified Intermediate System-to-Intermediate System (IS-IS) interface.

## Syntax

```
isis auth-key { level-1 | level-2 } string
no isis auth-key { level-1 | level-2 } string
```

## Command Default

Disabled.

## Parameters

### level-1

Specifies Level 1 packets only.

### level-2

Specifies Level 2 packets only.

### string

Specifies a text string that is used as an authentication password. The string can be from 1 through 63 ASCII characters in length.

## Modes

Interface subtype configuration mode

## Usage Guidelines

The authentication mode must be configured on the interface using the **isis auth-mode** command before a *string* can be configured. If the authentication mode is reset, the authentication key must also be reset.

The **no** form of the command removes the configured authentication key for the IS-IS interface.

## Examples

The following example configures an authentication key for Level 1 packets on an IS-IS Ethernet interface.

```
device# configure terminal
device(config)# interface ethernet 1/1
device(conf-if-eth-1/1)# isis auth-key level-1 mykey
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# isis auth-mode

Specifies the type of authentication used for an Intermediate System-to-Intermediate System (IS-IS) interface.

## Syntax

```
isis auth-mode md5 { level-1 | level-2 }
```

```
no isis auth-mode md5 { level-1 | level-2 }
```

## Command Default

Disabled.

## Parameters

**md5**

Specifies message Digest 5 (MD5) authentication.

**level-1**

Specifies Level 1 packets only.

**level-2**

Specifies Level 2 packets only.

## Modes

Interface subtype configuration mode

## Usage Guidelines

The **no** form of the command removes the configured authentication mode.

## Examples

The following example specifies that MD5 authentication is performed on Level 1 packets on an IS-IS Ethernet interface.

```
device# configure terminal
device(config)# interface ethernet 1/1
device(conf-if-eth-1/1)# isis auth-mode MD5 level-1
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# isis bfd

Enables Bidirectional Forwarding Detection (BFD) on a specific Intermediate System to Intermediate System (IS-IS) interface.

## Syntax

**isis bfd**

**no isis bfd**

## Modes

Interface subtype configuration mode

## Usage Guidelines

BFD sessions are initiated only if BFD is also enabled globally using the **bfd** command in IS-IS router configuration mode. If BFD is disabled using the **no bfd** command in IS-IS router configuration mode, BFD sessions on specific IS-IS interfaces are deregistered.

The **no** form of the command removes all BFD sessions from a specified interface.

## Examples

The following example enables BFD on an IS-IS Ethernet interface.

```
device# configure terminal
device(config)# interface ethernet 1/4
device(config-if-eth-1/4)# isis bfd
```

The following example disables BFD on an IS-IS virtual Ethernet (VE) interface.

```
device# configure terminal
device(config)# interface ve 24
device(config-if-ve-24)# no isis bfd
```

## History

Release version	Command history
17r.1.01	This command was introduced.

# isis circuit-type

Configures the type of adjacency used for an Intermediate System-to-Intermediate System (IS-IS) interface.

## Syntax

```
isis circuit-type { level-1 | level-1-2 | level-2 }
```

```
no circuit-type { level-1 | level-1-2 | level-2 }
```

## Command Default

Level 1 and Level 2 adjacency is configured by default.

## Parameters

### level-1

Specifies Level 1 packets only.

### level-1-2

Specifies Level 1 and Level 2 packets.

### level-2

Specifies Level 2 packets only.

## Modes

Interface subtype configuration mode

## Usage Guidelines

The **no** form of the command resets the type of adjacency to the default value of Level 1 and Level 2 adjacency.

## Examples

The following example configures Level 1 adjacency on an IS-IS Ethernet interface.

```
device# configure terminal
device(config)# interface ethernet 1/1
device(config-if-eth-1/1)# isis circuit-type level-1
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# isis hello-interval

Specifies how often an Intermediate System-to-Intermediate System (IS-IS) interface sends hello messages to its IS-IS neighbors.

## Syntax

```
isis hello-interval { level-1 | level-2 } value
no isis hello-interval { level-1 | level-2 } value
```

## Command Default

Disabled.

## Parameters

### level-1

Configures the hello interval for Level 1 only.

### level-2

Configures the hello interval for Level 2 only.

### value

Specifies the interval. Valid values range from 1 through 63 seconds. The default is 10.

## Modes

Interface subtype configuration mode

## Usage Guidelines

The **no** form of the command resets the hello interval to the default value of 10 seconds.

## Examples

The following example changes the hello interval for Level 1 packets to 20 on an Ethernet interface.

```
device# configure terminal
device(config)# interface ethernet 1/1
device(config-if-eth-1/1)# isis hello-interval level-1 20
```

The following example changes the hello interval for Level 2 packets to 40 on a loopback interface.

```
device# configure terminal
device(config)# interface loopback 1
device(config-loopback-1)# isis hello-interval level-2 20
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# isis hello-multiplier

Specifies the number of Intermediate System-to-Intermediate System (IS-IS) hello packets a neighbor must miss before the device declares adjacency as down.

## Syntax

```
isis hello-multiplier { level-1 | level-2 } multiplier
```

```
no isis multiplier { level-1 | level-2 } multiplier
```

## Command Default

The default is 3.

## Parameters

### level-1

Configures the hello multiplier for Level 1 adjacencies.

### level-2

Configures the hello multiplier for Level 2 adjacencies.

### multiplier

Specifies the multiplier. Valid values range from 3 through 1000. The default is 3.

## Modes

Interface subtype configuration mode

## Usage Guidelines

The hello multiplier is the number by which an IS-IS interface multiplies the hello interval to obtain the hold time for Level-1 and Level-2 IS-IS hello PDUs.

The **no** form of the command restores the default of 10 seconds.

## Examples

The following example changes the hello multiplier for Level 1 packets for an Ethernet interface.

```
device# configure terminal
device(config)# interface ethernet 1/1
device(conf-if-eth-1/1)# isis hello-multiplier level-1 10
```

The following example changes the hello multiplier for Level 2 packets for a loopback interface.

```
device# configure terminal
device(config)# interface loopback 1
device(config-Loopback-1)# isis hello-multiplier level-2 20
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# isis hello padding

Re-enables Intermediate System-to-Intermediate System (IS-IS) hello padding at the interface level.

## Syntax

```
isis hello padding [ disable ]
no isis hello padding [ disable ]
```

## Command Default

IS-IS hello padding is enabled.

## Parameters

**disable**  
Disables hello padding on the interface.

## Modes

Interface subtype configuration mode

## Usage Guidelines

Generally, you do not need to disable padding unless a link is experiencing slow performance. If you enable or disable padding on an interface, the interface setting overrides the global setting configured using the **hello padding** command.

The **no** form of the command disables hello padding.

## Examples

The following example re-enables IS-IS hello padding on an Ethernet interface.

```
device# configure terminal
device(config)# interface ethernet 1/1
device(config-if-eth-1/1)# isis hello padding
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# isis ipv6 metric

Configures the metric value for an interface under IPv6 Intermediate System-to-Intermediate System (IS-IS) MT.

## Syntax

```
isis ipv6 metric { level-1 | level-2 } metric
```

```
no ipv6 metric { level-1 | level-2 } metric
```

## Command Default

The default is 10.

## Parameters

### level-1

Specifies Level 1 only.

### level-2

Specifies Level 2 only.

### multiplier

Specifies the metric value. Valid values range from 1 through 16777215. The default is 10.

## Modes

Interface subtype configuration mode

## Usage Guidelines

Each IS-IS interface has a separate metric value. In IPv6 IS-IS MT, different metrics are configured on an interface for IPv4 and IPv6. When the metric value is configured for an interface, it rebuilds the route LSP and triggers IPv6 IS-IS MT SPF calculation.

The **no** form of the command resets the metric value to the default value of 10.

## Examples

The following example changes the metric value for Level 1 packets for an Ethernet interface under IPv6 IS-IS MT to 25.

```
device# configure terminal
device(config)# interface ethernet 1/1
device(conf-if-eth-1/1)# isis ipv6 metric level-1 25
```

The following example changes the metric value for Level 2 packets for a loopback interface under IPv6 IS-IS MT to 60.

```
device# configure terminal
device(config)# interface loopback 1
device(config-loopback-1)# isis ipv6 metric level-2 60
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# isis ldp-sync

Enables synchronization with Intermediate System-to-Intermediate System (IS-IS) for an interface.

## Syntax

```
isis ldp-sync { disable | enable}
```

```
no isis ldp-sync { disable | enable}
```

## Command Default

Disabled.

## Parameters

disable

Disables LDP synchronization.

enable

Enables LDP synchronization.

## Modes

Interface subtype configuration mode

## Usage Guidelines

The **no** form of the command disables synchronization with IS-IS for an interface.

## Examples

The following example enables LDP synchronization for an ethernet interface.

```
device# configure terminal
device(config)# interface ethernet 1/1
device(conf-if-eth-1/1)# isis ldp-sync enable
```

The following example disables LDP synchronization for a loopback interface.

```
device# configure terminal
device(config)# interface loopback 1
device(config-Loopback-1)# isis ldp-sync disable
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# isis metric

Configures the value of an Intermediate System-to-Intermediate System (IS-IS) metric.

## Syntax

```
isis metric { level-1 | level-2 } metric
```

```
no metric { level-1 | level-2 } metric
```

## Command Default

The default is 10.

## Parameters

### level-1

Specifies Level 1 only.

### level-2

Specifies Level 2 only.

### metric

Specifies the metric. Valid values range from 1 through 63 for the narrow metric style (the default metric style for IPv4 ISIS). Valid values range from 1 through 16777215 for the wide metric style (the default metric style for IPv4 ISIS).

## Modes

Interface subtype configuration mode

## Usage Guidelines

Each IS-IS interface has a separate metric value.

The device applies the interface-level metric to routes originated on the interface and when calculating routes. The device does not apply the metric to link-state information received from one intermediate system and flooded to other intermediate systems.

If the metric value you want to use is higher than 63 but you have not changed the metric style to wide, you must change the metric style first, and then set the metric. The IS-IS neighbors that receive the advertisements must also be enabled to receive wide metrics.

The **no** form of the command resets the metric value the default value of 10.

## Examples

The following example changes the metric for an Ethernet interface, specifying Level 1 packets.

```
device# configure terminal
device(config)# interface ethernet 1/1
device(conf-if-eth-1/1)# isis metric 25 level-1
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# isis passive

Disables adjacency formation and advertisements on an Intermediate System-to-Intermediate System (IS-IS) interface.

## Syntax

**isis passive**

**no isis passive**

## Command Default

Adjacency formation and advertisements is disabled on loopback interfaces. Adjacency formation and advertisements is enabled on all other interfaces.

## Modes

Interface subtype configuration mode

## Usage Guidelines

A device advertises an IS-IS interface to its area regardless of whether adjacency formation is enabled.

The **no** form of the command re-enables adjacency formation and advertisements on the IS-IS interface.

## Examples

The following example disables adjacency formation and advertisements on an Ethernet interface.

```
device#configure terminal
device(config)# interface ethernet 2/2
device(conf-if-eth-2/2)# isis passive
```

The following example enables adjacency formation and advertisements on a loopback interface.

```
device#configure terminal
device(config)# interface loopback 1
device(config-Loopback-1)# no isis passive
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# isis point-to-point

Configures the network type for the Intermediate System-to-Intermediate System (IS-IS) interface as point-to-point.

## Syntax

**isis point-to-point**

**no isis point-to-point**

## Command Default

Disabled.

## Modes

Interface subtype configuration mode

## Usage Guidelines

The **no** form of the command removes the configured point-to-point network type.

## Examples

The following example configures a network type of point-to-point for an Ethernet interface.

```
device#configure terminal
device(config)# interface ethernet 2/2
device(conf-if-eth-2/2)# isis point-to-point
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# isis priority

Determines the priority of the interface for being elected as a Designated IS.

## Syntax

```
isis priority { level-1 | level-2 } value
```

```
no isis priority { level-1 | level-2 } value
```

## Command Default

The default is 64.

## Parameters

### level-1

Sets the priority for Level 1 only.

### level-2

Sets the priority for Level 2 only.

### value

Specifies the priority. Valid values range from 0 through 127. The default is 64.

## Modes

Interface subtype configuration mode

## Usage Guidelines

You can configure the same priority for both Level-1 and Level-2 or you can configure a different priority for each level. If two or more devices have the highest priority within a given level, the device with the highest MAC address becomes the Designated IS for that level.

You can set the IS-IS priority on an individual interface basis only. You cannot set the priority globally.

The **no** form of the command resets the priority value to the default value of 64.

## Examples

The following example changes the priority for Level 1 packets for an Ethernet interface.

```
device# configure terminal
device(config)# interface ethernet 1/1
device(conf-if-eth-1/1)# isis priority level-1 100
```

The following example changes the hello multiplier for Level 2 packets for a loopback interface.

```
device# configure terminal
device(config)# interface loopback 1
device(config-Loopback-1)# isis priority level-2 80
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# isis reverse-metric

Configures the reverse metric value on a single Intermediate System-to-Intermediate System (IS-IS) interface.

## Syntax

```
isis reverse-metric [ value ] [ te-def-metric ] [ whole-lan ]  
no isis reverse-metric [ value ] [ te-def-metric ] [ whole-lan ]
```

## Command Default

Disabled.

## Parameters

*value*

Specifies the reverse metric value in metric style. The narrow metric range is from 1 through 63. The wide metric range is from 1 through 16777215. The default value is 16777214 irrespective of the metric style configured.

**whole-lan**

Specifies that the configured reverse metric value affects the entire LAN.

**te-def-metric**

Specifies that the device sends a traffic engineering (TE) default metric sub-type-length-value (TLV) within the reverse metric TLV.

## Modes

Interface subtype configuration mode

## Usage Guidelines

If the reverse metric value is configured, the local LSP is updated with the sum of the default metric and the reverse metric value. When the IS-IS neighbor router receives the reverse metric value through the IS hello, the neighbor router updates the cost to reach the original IS-IS router with the sum of default metric and the reverse metric value. This helps in shifting traffic to the other alternate paths.

If the **whole-lan** option is not enabled, the reverse metric value affects only the neighbor router. The **whole-lan** option takes effect only on the multi-access LAN. IS-IS point-to-point interfaces are not affected when the **whole-lan** option is enabled.

The **no** form of the command removes the entire reverse metric configuration. The **no** form of the command specified with the configured value resets the metric value to the default value of 16777214.

## Examples

The following example configures a reverse metric value of 40 on an Ethernet interface. The **whole-lan** option is enabled to include the entire LAN.

```
device#configure terminal
device(config)# interface ethernet 2/2
device(conf-if-eth-2/2)# isis reverse-metric 40 whole-lan
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# is-type

Changes the Intermediate System-to-Intermediate System (IS-IS) level globally.

## Syntax

```
is-type { level-1 | level-1-2 | level-2 }
no is-type { level-1 | level-1-2 | level-2 }
```

## Command Default

The device operates as both a Level 1 (intra-area) and a Level 2 (interarea) device.

## Parameters

- level-1**  
Specifies that the device performs only Level 1 (intra-area) routing.
- level-1-2**  
Specifies that the device performs both Level 1 and Level 2 routing.
- level-2**  
Specifies that the device performs only Level 2 (interarea) routing.

## Modes

IS-IS router configuration mode

## Usage Guidelines

The **no** form of the command enables support for both IS-IS levels, if one level has been disabled. Alternatively, the **level-1-2** parameter can be used.

## Examples

The following example changes the IS-IS level globally to Level-1 only.

```
device# configure terminal
device(config)# router isis
device(config-isis-router)# is-type level-1
```

The following example changes the IS-IS level globally to Level-2 only.

```
device# configure terminal
device(config)# router isis
device(config-isis-router)# is-type level-2
```

The following example changes the IS-IS level globally to Level-1 and Level-2 if support for one level has previously been disabled.

```
device# configure terminal
device(config)# router isis
device(config-isis-router)# is-type level-1-2
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# iterations

For an implementation of an event-handler profile, specifies the number of times an event-handler action is run, when triggered.

## Syntax

**iterations** *num-iterations*

**no iterations**

## Command Default

When the trigger condition occurs, the event-handler actions runs once.

## Parameters

*num-iterations*

Specifies the number of times an event-handler action is run, when triggered. Valid values are any positive integer.

## Modes

Event-handler activation mode

## Usage Guidelines

The **no** form of this command resets the **iterations** setting to the default 1 iteration.

## Examples

The following example specifies 5 iterations.

```
device# configure terminal
device(config)# event-handler activate eventHandler1
device(config-activate-eventHandler1)# iterations 5
```

The following example resets **iterations** to the default value of 1 iteration.

```
device# configure terminal
device(config)# event-handler activate eventHandler1
device(config-activate-eventHandler1)# no iterations
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# Commands K - M

---

## ka-int-count

Configures the number of keepalive intervals after which the session is terminated when no session keepalive or other LDP protocol message is received from the LDP peer.

### Syntax

`ka-int-count` *number*  
`no ka-int-count` *number*

### Command Default

The default is a count of six intervals.

### Parameters

*number*  
Specifies the number of keepalive time intervals. Enter an integer from 1 to 65535.

### Modes

MPLS LDP configuration mode

### Usage Guidelines

Use the **no** form of the command to reset the default count of six intervals.

### Examples

The following example configures a keepalive interval count of three.

```
device# configure terminal
device(config)# router mpls
device(config-router-mpls)# ldp
device(config-router-mpls-ldp)# ka-int-count 3
```

### History

Release version	Command history
16r.1.00	This command was introduced.

# ka-interval

Sets the keepalive time interval at which the session keepalive message is sent when no other LDP protocol message is sent to the LDP peer.

## Syntax

**ka-interval** *seconds*

**no ka-interval** *seconds*

## Command Default

The default is six seconds.

## Parameters

*seconds*

Specifies the keepalive time interval in seconds. Enter an integer from 1 to 65535.

## Modes

MPLS LDP configuration mode

## Usage Guidelines

The **ka-interval** and the **ka-timeout** configurations are mutually exclusive and you may have only one configured at a time. You must explicitly remove the configuration for one in order to change to the other configuration.

When the keepalive timeout value is configured, the **show mpls ldp** command displays keepalive interval as keepalive timeout divided by the keepalive interval count (ka-timeout/ka-in-count).

A message is displayed whenever the **ka-interval** value is changed.

```
"Please clear LDP sessions for the new KA parameter value to take effect on existing sessions"
```

Use the **no** form of the command to reset the default of six seconds.

## Examples

The following example configures a keepalive interval of 10 seconds.

```
device# configure terminal
device(config)# router mpls
device(config-router-mpls)# ldp
device(config-router-mpls-ldp)# ka-interval 10
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ka-timeout

Sets the keepalive timeout after which the session is terminated when the keepalive or LDP protocol message is not received.

## Syntax

**ka-timeout** *seconds*

**no ka-timeout** *seconds*

## Command Default

The default is six seconds.

## Parameters

*seconds*

Specifies the keepalive timeout in seconds. Enter an integer from 1 to 65535.

## Modes

MPLS LDP configuration mode

## Usage Guidelines

After an LDP session is established, an LSR maintains the integrity of the session by sending keepalive messages. The keepalive timer for each peer session resets whenever it receives any LDP protocol message or a keepalive message on that session. When the keepalive timer expires, LDP concludes that the TCP connection is bad or the peer is dead and terminates the session.

When the keepalive timeout value is configured, the **show mpls ldp** command displays keepalive interval as keepalive timeout divided by the keepalive interval count (ka-timeout/ka-in-count).

The **ka-interval** and the **ka-timeout** configurations are mutually exclusive and you may have only one configured at a time. You must explicitly remove the configuration for one in order to change to the other configuration.

A message is displayed whenever the **ka-timeout** value is changed.

```
"Please clear LDP sessions for the new KA parameter value to take effect on existing sessions"
```

Use the **no** form of the command to reset the default timeout of six seconds.

## Examples

The following example configures a keepalive timeout of 180 seconds.

```
device# configure terminal
device(config)# router mpls
device(config-router-mpls)# ldp
device(config-router-mpls-ldp)# ka-timeout 180
```



## History

Release version	Command history
16r.1.00	This command was introduced.

## key

Specifies a text string to be used as a shared secret between the device and the Remote Authentication Dial-In User Service (RADIUS) server.

## Syntax

**key** *shared\_secret*

**no key**

## Command Default

The default value is "sharedsecret".

## Parameters

*shared\_secret*

The text string that is used as the shared secret between the device and the RADIUS server. The default string is "sharedsecret". The exclamation mark (!) is supported for RADIUS servers, and you can specify the shared secret string in either double quotation marks or by using the escape character (\); for example, "**secret!key**" or **secret\\key**.

## Modes

RADIUS server host VRF configuration mode

## Usage Guidelines

The **key** command does not support an empty string.

The **no** form of the command restores the command default value.

## Examples

The following example shows how to configure the text string "new#radius\*secret" as the shared secret between the device and the RADIUS server.

```
device# configure terminal
device(config)# radius-server host 10.37.73.180 use-vrf green-vrf
device(config-host-10.37.73.180/green-vrf)# key "new#radius*secret"
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# key-add-remove-interval

Alters the timing of the authentication key add-remove interval.

## Syntax

**key-add-remove-interval** *interval*

**no key-add-remove-interval** *interval*

## Parameters

*interval*

Specifies the add-remove interval in seconds. Valid values range from 0 through 14400. The default is 300 seconds.

## Modes

OSPFv3 router configuration mode

OSPFv3 router VRF configuration mode

## Usage Guidelines

The **no** form of the command resets the add-remove interval to the default value of 300 seconds.

## Examples

The following example sets the key add-remove interval to 240 seconds.

```
device# configure terminal
device(config)# ipv6 router ospf
device(config-ipv6-router-ospf-vrf-default-vrf)# key-add-remove-interval 240
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# key-rollover-interval

Alters the timing of the existing configuration changeover.

## Syntax

**key-rollover-interval** *interval*

**no key-rollover-interval** *interval*

## Parameters

*interval*

Specifies the key-rollover-interval in seconds. Valid values range from 0 through 14400. The default is 300 seconds.

## Modes

OSPFv3 router configuration mode

OSPFv3 router VRF configuration mode

## Usage Guidelines

In order to have consistent security parameters, rekeying should be done on all nodes at the same time. Use the **key-rollover-interval** command to facilitate this. The key rollover timer waits for a specified period of time before switching to the new set of keys. Use this command to ensure that all the nodes switch to the new set of keys at the same time.

The **no** form of the command resets the rollover interval to the default value of 300 seconds.

## Examples

The following example sets the key rollover interval to 420 seconds.

```
device# configure terminal
device(config)# ipv6 router ospf
device(config-ipv6-router-ospf-vrf-default-vrf)# key-rollover-interval 420
```

The following example re-sets the key rollover interval to the default value.

```
device# configure terminal
device(config)# ipv6 router ospf
device(config-ipv6-router-ospf-vrf-default-vrf)# no key-rollover-interval 420
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# keypair

Associates the generated RSA/ECDSA/DSA key pair with a trust point for security protocol exchanges for applications.

## Syntax

Associates the generated RSA/ECDSA/DSA key pair with the trust point.

```
keypair key_label
```

```
no keypair
```

## Parameters

*key\_label*

Specifies the name of the key pair to associate with the trust point.

## Modes

Trust point configuration mode

## Usage Guidelines

Use the **no keypair** command to remove the key pair association.

## Examples

Typical command usage:

```
device(config)# crypto ca trustpoint t1
device(config-ca-t1)# keypair k1
device(config-ca-t1)# do show running-config crypto
crypto key label k1 rsa modulus 2048
crypto ca trustpoint t1
keypair k1
!
device# show crypto ca trustpoint
trustpoint: t1; key-pair: k1
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# label-withdrawal-delay

Delays sending a label withdrawal message for a FEC to a neighbor in order to allow the IGP and LDP to converge.

## Syntax

**label-withdrawal-delay** *secs*

**no label-withdrawal-delay**

## Command Default

The default is 60.

## Parameters

*secs*

Specifies the delay period in seconds for the label withdrawal delay timer. Enter value from 0 to 300.

## Modes

MPLS LDP configuration mode.

## Usage Guidelines

Setting the *secs* variable to zero (0) disables the feature for subsequent events.

Setting the *secs* variable to a value from 1 to 300, updates the configured value.

When using the **no** form of the command to restore the default behavior.

## Examples

The following example sets the label withdrawal delay timer to 30 seconds.

```
device(config-router-mpls-ldp)# label-withdrawal-delay 30
```

The following example restores the command default behavior.

```
device(config-mpls-router-ldp)# no label-withdrawal-delay
```

The following example disables the label withdrawal delay timer.

```
device(config-mpls-router-ldp)# label-withdrawal-delay 0
```

## History

Release	Command history
16r. 1.00	This command is introduced.

# lACP default-up

Activates an Link Aggregation Control Protocol (LACP) link in the absence of PDUs.

## Syntax

**lACP default-up**

**no lACP default-up**

## Modes

Interface subtype configuration mode

## Usage Guidelines

This command forces the port to activate an LACP link if there are no PDUs available on the interface port.

This command is supported on all physical interfaces.

This command is visible only if the interface is a dynamic and standard member of a port-channel.

This command is not supported on static LAGs.

This command is not supported on static or dynamic SLX trunks.

## Examples

The following example activates an LACP link in the absence of PDUs on an Ethernet interface.

```
device# configure terminal
device(config)# interface ethernet 0/11
device(config-if-eth-0/11)# lACP default-up
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# lACP port-priority

Configures the Link Aggregation Control Protocol (LACP) port priority of a member port of a port-channel.

## Syntax

**lACP port-priority** *value*

**no lACP port-priority**

## Parameters

*value*

Specifies the priority. Valid values range from 1 through 65535. A lower number takes priority over a higher number. The default value is 32768.

## Modes

Interface subtype configuration mode.

## Usage Guidelines

An LACP port priority is configured on each port using LACP. The port priority determines which ports should be put in standby mode when there is a hardware limitation that prevents all compatible ports from aggregating.

A link with higher priority (smaller in value) gets preference over a link with lower priority (greater in value).

The **no** form of the command returns the default value.

## Examples

The following example sets the LACP port priority to 1000 for an Ethernet interface.

```
device# configure terminal
device(config)# interface ethernet 0/2
device(config-if-eth-0/2)# lACP port-priority 1000
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# lACP system-priority

Sets the Link Aggregation Control Protocol (LACP) system priority. The LACP priority determines which system is responsible for resolving conflicts in the choice of aggregation groups.

## Syntax

`lACP system-priority value`

`no lACP system-priority`

## Command Default

The default value is 32768.

## Parameters

*value*

Specifies the value of the LACP system priority. Valid values range from 1 through 65535.

## Modes

Global configuration mode

## Usage Guidelines

Lower numerical values have higher priorities.

Enter `no lACP system-priority` to reset the system priority to the default value.

## Examples

The following example sets the LACP system priority value to 68.

```
device# configure terminal
device(config)# lACP system-priority 68
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# lACP timeout

Sets the timeout value used by the Link Aggregation Control Protocol (LACP) to exchange packets on an interface before invalidating a received data unit (DU).

## Syntax

```
lACP timeout { long | short }
```

```
no lACP timeout
```

## Command Default

For trunks on an SLX-OS device, the default value is the **short** timeout.

For standard LAGs, the default value is the **long** timeout.

## Parameters

### long

Specifies that a long-timeout value of 30 seconds will be used. With this value, the port waits three times this long (90 seconds) before invalidating the information received earlier on this PDU.

### short

Specifies that a short-timeout value of one second will be used. With this value, the port waits three times this long (three seconds) before invalidating the information received earlier on this PDU.

## Modes

Interface subtype configuration mode

## Usage Guidelines

Use this command to set the timeout value based on how frequently you think the switch will receive LACP PDUs from the partner device.

The **no** form of the command restores the default values.

## Examples

The following example sets the LACP long-timeout value on an Ethernet interface.

```
device# configure terminal
device(config)# interface ethernet 0/2
device(conf-if-eth-0/2)# lACP timeout long
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# lACP-pdu-forward enable

Configures the device to forward LACP PDUs received on an interface where LACP is not configured, to the VLAN on which the LACP PDUs are received.

## Syntax

**lACP-pdu-forward enable**

**no lACP-pdu-forward enable**

## Command Default

LACP PDUs received on an interface where LACP is not configured are discarded.

## Modes

Interface subtype configuration mode

## Usage Guidelines

LACP PDUs are forwarded only when they are received on a physical interface or static port channel interface. LACP PDUs cannot be forwarded if they are received on a LACP based dynamic port channel.

LACP PDU forwarding enabled on a static port channel applies to all the member ports.

When LACP is enabled on a port, it overrides LACP PDU forwarding configuration and the PDUs are trapped to CPU.

Enabling and disabling of BPDU drop on a bridge domain does not impact LACP PDU forwarding.

Use the **no** form of the command to disable LACP PDU forwarding.

## Examples

The following example configures LACP PDU forwarding on a physical interface.

```
device# configure terminal
device(config)# interface ethernet 4/1
device(conf-if-eth-4/1)# lACP-pdu-forward enable
```

The following example configures LACP PDU forwarding on a static port channel interface.

```
device# configure terminal
device(config)# interface port-channel 10
device(config-Port-channel-10)# lACP-pdu-forward enable
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# latch-detection

Configures the latch detection status for a line card on the device.

## Syntax

```
latch-detection { disable | enable } linecard linecard-id
```

## Command Default

By default, latch detection is enabled on line cards that support latch detection.

By default, latch detection is disabled on older line cards that do not support latch detection.

## Parameters

### disable

Causes latch detection to be disabled on a line card after the system is rebooted.

### enable

Causes latch detection to be enabled on a line card after the system is rebooted.

### linecard *linecard-id*

Specifies a line card ID. On the SLX 9850-4 platform the range is from 1 through 4. On the SLX 9850-8 platform the range is from 1 through 8.

## Modes

Privileged EXEC mode

## Usage Guidelines

The following line cards support latch detection.

**TABLE 3** Line cards that support latch detection

Module	Type ID	Version
72 X 10G	180	6 and above
36 X 100G	181	4 and above

When you need to use a line card that has a damaged latch screw or when the latch screw cannot be installed, use the **latch-detection** command to disable latch detection on the line card.

The active latch detection configuration is stored on the line card. Because latch detection configuration is only detected and applied during line card initialization, the system must be rebooted after latch detection configuration.

### NOTE

You cannot enable latch detection on older line cards that do not have latch screws. On reboot, the system checks the module type and version before applying a newly-configured latch detection setting; latch detection is always disabled on older line cards.

## Examples

The following example disables latch detection on line card 1.

```
device# latch-detection disable linecard 1
```

```
Latch-Detection is disabled on Linecard 1. Please reboot the system.
```

## History

Release version	Command history
17r.1.01	This command was introduced.

# ldap-server host

Configures an LDAP-server host.

## Syntax

```
ldap-server host [ use-vrf vrf-name ]
```

```
ldap-server host { ipaddr | FQDN } [ port portnum ] [ domain basedn ] [ timeout secs ] [ retries num ]
```

```
no ldap-server host { ipaddr | FQDN } [ use-vrf vrf-name ]
```

## Command Default

- Timeout: 5 seconds
- Port: 389
- Retries: 5

## Parameters

**use-vrf** *vrf-name*

Specifies a VRF through which to communicate with the LDAP server. See the Usage Guidelines.

*ipaddr* | *FQDN*

Specifies the IPv4 address or Fully Qualified Domain name of the Active Directory (AD) server. IPv6 is supported for Windows 2008 AD server only. The maximum supported length for the LDAP host name is 40 characters.

**port** *portnum*

Specifies the TCP port used to connect the AD server for authentication. The port range is from 1024 through 65535.

**domain** *basedn*

Describes the base domain name of the host.

**timeout** *secs*

Specifies the wait time for a server to respond. The range is 1 through 60 seconds.

**retries** *num*

Specifies the number of retries for the server connection. The range is 0 through 100.

## Modes

Global configuration mode

## Usage Guidelines

Use this command to sets up a connection to the Lightweight Directory Access Protocol (LDAP) server host, or modifies an existing configuration. A maximum of 5 LDAP servers can be configured on a device. Executing "no" on an attribute sets it with its default value.

Enter **no ldap-server host** to delete the server configuration.

Invoking **no** on an attribute sets the attribute with its default value.

By default, all management services are enabled on the management VRF ("mgmt-vrf") and the default VRF ("default-vrf").

## Examples

To add an LDAP server on port 3890 with retries set to three:

```
device(config)# ldap-server host 10.24.65.6
device(config-host-10.24.65.6/mgmt-vrf)# domain sec.extreme.com port 3890 retries 3
```

To change the domain in an existing configuration:

```
device(config)# ldap-server host 10.24.65.6
device(config-host-10.24.65.6/mgmt-vrf)# domain security.extreme.com
```

To delete an LDAP server:

```
device(config)# no ldap-server host 10.24.65.6
```

To reset the number of retries to the default value:

```
device(config)# ldap-server host 10.24.65.6
device(config-host-10.24.65.6/mgmt-vrf)# retries
```

Executing **no** on an attribute sets it with its default value.

```
device(config)# ldap-server host 10.24.65.6
device(config-host-10.24.65.6/mgmt-vrf)# no retries
```

Attributes holding default values will not be displayed.

```
device(config-host-10.24.65.6/mgmt-vrf)# do show running-config ldap-server host 10.24.65.6
ldap-server host 10.24.65.6 use-vrf mgmt-vrf
port 3890 retries 3 timeout 8 basedn security.extreme.com
```

## History

Release version	Command history
16r.1.00	This command was added.



# ldap-server maprole

Maps an Active Directory (AD) group to a device role.

## Syntax

```
ldap-server maprole group group_name role role_name
no ldap-server maprole group group_name
```

## Parameters

**group** *group\_name*  
The name of the AD group.

**role** *role\_name*  
The name of the device role.

## Modes

Global configuration mode

## Usage Guidelines

Enter **no ldap-server maprole** *group\_name* without the **role** *role\_name* parameter to remove the mapping of the AD group to a role.

## Examples

To map the AD group "Administrator" to the device role "admin":

```
device(config)# ldap-server maprole group Administrator role admin
```

To remove the mapping:

```
device(config)# no ldap-server maprole group Administrator
```

## History

Release version	Command history
16r.1.00	This command was added.

# ldp

Enables the Label Distribution Protocol (LDP) mode to configure LDP global parameters.

## Syntax

```
ldp  
no ldp
```

## Modes

MPLS configuration mode

## Usage Guidelines

Use the **no** form of this command to remove the LDP configurations from the device.

## Examples

The following example enables LDP configuration mode.

```
device# configure terminal  
device(config)# router mpls  
device(config-router-mpls)# ldp
```

## History

Release version	Command history
16r. 1.00	This command was introduced.

# ldp-enable

Enables LDP on an interface.

## Syntax

**ldp-enable**

**no ldp-enable**

## Modes

MPLS interface configuration mode

## Usage Guidelines

For an LDP session between routers, you must configure LDP on an interface to allow the device to advertise its loopback interface to the peers.

To use LDP, configure a loopback address with a 32-bit mask on the LSR. The first loopback address configured on the device is used in its LDP identifier. When the loopback address used in the LDP identifier is removed, all LDP functions on the LSR are shut down. LDP sessions between the LSR and its peers are terminated, and LDP-created tunnels are removed. When other loopback interfaces are configured on the device, the lowest-numbered loopback address is used as a new LDP identifier. LDP sessions and tunnels are set up using this new LDP identifier.

Configure LDP on the same set of interfaces that IGP routing protocols such as OSPF and IS-IS are enabled.

Use the **no** form of the command to disable LDP on the interface.

## Examples

The following example configures LDP on an interface.

```
device# configure terminal
device(config)# router mpls
device(config-router-mpls)# mpls-interface ethernet 1/2
device(config-router-mpls-interface-1/2)# ldp-enable
```

## History

Release version	Command history
16r. 1.00	This command was introduced.

# ldp-params

Allows you to access ldp-params subconfiguration mode to configure LDP parameters on an interface.

## Syntax

```
ldp-params
no ldp-params
```

## Modes

MPLS interface configuration mode

## Usage Guidelines

When you use this command, you can configure the LDP Hello interval and timeout parameters on the interface.

Use the **no** form of the command to remove the LDP parameter configuration.

## Examples

The following example accesses ldp-params subconfiguration mode.

```
device# configure terminal
device(config)# router mpls
device(config-router-mpls)# mpls-interface ethernet 1/2
device(config-router-mpls-interface-1/2)# ldp-params
device(config-router-mpls-interface-1/2-ldp-params)#
```

## History

Release version	Command history
16r. 1.00	This command was introduced.

# ldp-sync

Enables Multiprotocol Label Switching (MPLS) Label Distribution Protocol-Interior Gateway Protocol (LDP-IGP) synchronization globally with Intermediate System-to-Intermediate System (IS-IS) or Open Shortest Path First (OSPF), and configures the hold-down time interval.

## Syntax

```
ldp-sync [ hold-down seconds ]
```

```
no ldp-sync [ hold-down ]
```

## Command Default

Disabled.

## Parameters

**hold-down** *seconds*

Sets the LDP-IGP synchronization hold-down time interval in seconds. The IGP must advertise the maximum IP metric while waiting for an update from the LDP. Valid values range from 1 through 65535 seconds. The default is 30.

## Modes

OSPF router configuration mode

IS-IS address-family IPv4 unicast configuration mode

## Usage Guidelines

The **ldp-sync** command supports point-to-point interfaces, but not tunnel interfaces.

This command affects IPv4 metrics only.

When enabled on IS-IS, consider the following:

- The feature applies to both level-1 and level-2 metrics.
- The wide metric-style is required.

The **no ldp-sync** command disables LDP-IGP synchronization.

The **no ldp-sync hold-down** command resets the hold down time interval to the default setting of 30 seconds.

## Examples

The following example enables MPLS LDP-IGP synchronization globally with OSPF and IS-IS, and sets the hold-down time interval to 100 seconds.

```
device(config)# router ospf
device(config-router-ospf-vrf-default-vrf)# ldp-sync
device(config-router-ospf-vrf-default-vrf)# ldp-sync hold-down 100
device(config-router-ospf-vrf-default-vrf)# exit
device(config)# router isis
device(config-isis-router)# address-family ipv4 unicast
device(config-router-isis-ipv4u)# metric-style wide
device(config-router-isis-ipv4u)# ldp-sync
device(config-router-isis-ipv4u)# ldp-sync hold-down 100
```

## History

Release version	Command history
16r. 1.00	This command was introduced.

# license add

Adds a license key to a switch.

## Syntax

```
license add { licstr licenseString | FTP-URL ftpPath | SCP-URL scpPath } [ slot slot-number ]
```

## Command Default

This command is executed on the local switch.

## Parameters

**licstr** *licenseString*

Specifies the license string to be added to the switch. The license string must be enclosed in double quotation marks. A maximum of 256 characters is allowed.

**FTP-URL** *ftpPath*

Specifies a URL from which to transfer license information using FTP. *ftp://username:password@hostname filepath*

**SCP-URL** *scpPath*

Specifies a URL from which to transfer license information using SCP. *scp://username:password@hostname/ filepath*

**slot** *slot-number*

Specifies the LC slot number where the license key is added. The slot zero refers to the chassis license. The non-zero slot number refer to the physical slot number on the LC, as displayed in the output of the **show slot** command.

## Modes

Privileged EXEC mode

## Usage Guidelines

Depending on the feature being added, you may need to disable and re-enable the affected ports for this command to take effect. Follow the instructions in the command output.

If you install a license on an unsupported platform, the operation succeeds, but the **show license** output indicates that the license is not supported.

## Examples

To add a license on slot 1:

```
device# license add SCP-URL scp://fvt:pray4green@10.70.5.58//users/home40/"pray4green/
20141113164801170PORT_UPGRADE.xml slot 1
```

```
License Added [*B
OXw:jfQ0IZc,t1D12:fZVuQByBOJMeqIoPhjppHK9gJLrcLzYIbEXVmDCd8N4nRyTfdxoGQI93gRS9y10:cf00If68JA1flHZzMQs4:ei
IlC,VbOpX4E6UG8YeXWcaVIBSTVv#] Successfully - For license change to take effect, it may be necessary to
enable ports...
```

## History

Release version	Command history
17r.1.00	This command was introduced.



# license eula

Enables the user to accept or decline the EULA for a SAU licensed feature.

## Syntax

```
license eula { accept feature | decline feature }
```

## Command Default

This command is executed on the local switch.

## Parameters

### accept

Specifies that the user wants to use the feature without an installed license.

### feature

Specifies the displayed license feature name.

### decline

Specifies that the user no longer want to use the unlicensed SAU feature.

## Modes

Privileged EXEC mode.

## Usage Guidelines

When the **license eula accept** command is entered, you are agreeing to purchase a license within a specific timeframe. You can begin using the features immediately. Use the **show license** command to display the SAU license when the EULA is accepted.

When the **license eula decline** command is entered, you are no longer able to use the licensed features. Before you can decline the licensed features, all configuration settings related to the feature must be restored to default settings.

## Examples

The following example shows how to accept the EULA for the SAU license (Advanced Features).

```
device# license eula accept ADVANCED_FEATURES
2016/11/24-23:58:11, [SEC-1120], 41,, INFO, SLX9540, License EULA entry added for ADVANCED_FEATURES
feature (capacity 0).

EULA accepted for feature [ADVANCED_FEATURES]

Use of the ADVANCED_FEATURES feature requires a license to be purchased within 30 days.
By accepting the EULA you indicate that you have read and accept the Brocade End USER License Agreement
found at the following URL
[www.brocade.com/en/legal/software-terms-eulas/brocade-network-operating-system.html].
You can decline the EULA acceptance now by entering "license eula decline ADVANCED_FEATURES"
at the CLI prompt; declining the EULA will prevent use of the licensed feature.
```

The following example displays removing a SAU license (Advanced features).

```
device# license eula decline ADVANCED_FEATURES
```

```
EULA removed for feature [ADVANCED_FEATURES]
```

The following CLI message is displayed when you attempt to configure a feature that requires a SAU license, and you have not accepted the EULA and there is no SAU license installed for that feature.

```
No ADVANCED_FEATURES EULA accepted for this feature
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# license remove

Removes a license key from a switch or deactivates a temporary license that cannot be removed..

## Syntax

```
license remove licstr { licenseString | feature } [ slot number ]
```

## Command Default

This command is executed on the local switch.

## Parameters

**licstr** *licenseString*

Removes the specified license string and associated feature. The license string must be enclosed in double quotation marks.

**licstr** *feature*

Removes the license string associated with the specified feature from the license database of the local switch. The feature name must be enclosed in double quotation marks. Supported licensed features include the following:

PORT\_10G\_UPGRADE, PORT\_100G\_UPGRADE, PORT\_100G\_40G\_UPGRADE, MPLS, ADVANCED\_FEATURES, CAPACITY\_ON\_DEMAND.

**slot** *slot-number*

Specifies the LC slot number where the license key is added. The slot zero refers to the chassis license. The non-zero slot number refer to the physical slot number on the LC, as displayed in the output of the **show slot** command.

## Modes

Privileged EXEC mode

## Usage Guidelines

You cannot display the license string once you install it. If you do not remember the string, use the feature name displayed in the **show license** command output to remove the license.

Depending on the feature being removed you must first clear all license-related configurations, and possibly disable and re-enable selected ports for this command to take effect. Follow the instructions in the command output.

You must disable or remove all configurations related to a licensed feature before you can remove the license for that feature.

## Examples

To remove a license string based on the feature name on specific slot number, enter the following command.

```
device# license remove licstr 10G_PORT_UPGRADE slot 1
2014/11/13-16:40:53, [SEC-3051], 5613, SW/0 | Active, INFO, MYSWITCH, The license key 10G_PORT_UPGRADE
is Removed from Slot 1.
License Removed [10G_PORT_UPGRADE]
For license to take effect, it may be necessary to disable/enable ports or switch...
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# line vty exec-timeout

Sets the recurrent CLI idle timeout period.

## Syntax

`line vty exec-timeout timeout`

`no line vty exec-timeout`

## Command Default

If no value is specified, the timeout value is 10 minutes.

## Parameters

*timeout*

Specifies the CLI session timeout period in minutes. The timeout value specifies the amount of time a CLI session can be idle before it logs you out. Valid values range from 0 through 136. The default is 10.

## Modes

Global configuration mode

## Usage Guidelines

The `line vty exec timeout` command is a recurrent command, applying to all login sessions. The `terminal timeout` command applies only to the current session.

Even if other keys are pressed during the timeout period, the only keystroke that prevents logout is **Enter**.

This command is supported only on the local device.

This command is not available on the standby management module.

To restore the default timeout value of 10 minutes, enter `no line vty exec-timeout`.

## Examples

The following example sets the terminal timeout to 60 minutes.

```
device(config)# line vty exec-timeout 60
device(config-line-vty)# exit
device(config)# exit
device# show running-config line vty
line vty
exec-timeout 60
!
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# link-error-disable

Configures port flap dampening for the interface, including the threshold of link flapping to shut down the port and the time interval in which it remains shut down.

## Syntax

**link-error-disable** *toggle-threshold sampling-time-in-sec wait-time-in-sec*

**no link-error-disable**

## Command Default

Port flap dampening is disabled on the device.

## Parameters

*toggle-threshold*

Specifies the number of times a port link state goes from up to down and down to up before the wait period is activated. The value ranges from 1 through 50.

*sampling-time-in-sec*

Specifies the amount of time, in seconds, during which the specified toggle threshold can occur before the wait period is activated. Enter an integer from 1 through 65535.

*wait-time-in-sec*

Specifies the amount of time, in seconds, for which the port remains disabled (down) before it becomes enabled. The value ranges from 0 through 65535. A value of 0 indicates that the port will stay down until an administrative override occurs.

## Modes

Interface Ethernet configuration mode

## Usage Guidelines

Use the **no** form of the command to disable port flap dampening.

Port flap dampening allows you to configure a wait period before a port, whose link goes down then up, becomes enabled. This feature is available for all front ports on the device.

If the port link state toggles, from down to up or from up to down, for a specified number of times within a specified period, the interface is physically disabled for the specified wait period. Once the wait period expires, the port's link state is re-enabled. However, if the wait period is set to zero (0) seconds, or you want to re-enable the port before the wait period expires, the port must be manually re-enabled. To re-enable the port, reenter the **link-error-disable** command on the disabled port.

## Examples

The following example shows the configuration of port flap dampening. The toggle threshold is set to 10 times. The sampling time is set to 3 seconds. The wait time is set to 10 seconds.

```
device# configure terminal
device(config)# interface Ethernet 1/4
device(conf-if-eth-1/4)# link-error-disable 10 3 10
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# link-fault-signal

Configures RX and TX Link Fault Signaling (LFS) detection globally or on an interface port.

## Syntax

```
link-fault-signal rx { off | on } tx { off | on }  
no link-fault-signal
```

## Command Default

Both TX and RX LFS are enabled.

## Parameters

<b>rx</b>	Configure RX LFS detection.
<b>off</b>	Disables LFS.
<b>on</b>	Enables LFS.
<b>tx</b>	Configure TX LFS detection.

## Modes

Global and interface configuration modes

## Usage Guidelines

Use the **no** form of the command to reset RX and TX LFS to their default settings of enabled.

The interface must be in the shutdown state before you disable or enable TX LFS.

The SLX 9850 supports LFS detection for interface types of 10G, 40G, 100G, and 40G breakout ports. It detects local and remote faults.

LFS is not supported in 1G mode.

When the device detects a local fault, it returns a remote fault to the link partner. When the device detects a remote fault, it returns an idle state.

A port's physical link detection is independent of LFS detection. When either of these link fault signals is detected, the following behaviors occur:

- The link is declared as DOWN and the MM should display Protocol Down on the SLX-OS CLI.
- The physical link is not brought down in both of the previous cases. The peer side based on its implementation might display that the link is UP when the device displays that the link is DOWN due to a fault detection.

- The transmit (TX) packets, if any, are dropped at the MAC layer. The receive (RX) packets, if any, are dropped in the software.
- The detected signal is reported as a RASTRACE message on the line card. The same information is reported on the MM as a RASLOG. The same behavior occurs when the signal is cleared.

You can enable or disable LFS globally and on the interface level for both RX and TX directions:

- If the LFS is enabled for RX, the normal local and remote fault detection and processing described previously occur. If it is disabled for RX, local and remote fault detection are ignored.
- If the LFS is enabled for TX and a local fault occurs, a remote fault (pause frame) is generated to the remote side. If it is disabled for TX, the remote fault is not generated.

The interface configuration overrides the global configuration.

## Examples

The following example shows the global and interface configuration of LFS. In this example, the global LFS is disabled for the link fault RX and enabled for link fault TX. The LFS for the interface is enabled for the link fault RX and disabled for the link fault TX, overriding the global configuration.

```
device# configure terminal
device(config)# link-fault-signaling rx off tx on
device(config)# interface Ethernet 2/1
device(conf-if-eth-2/1)# shutdown
device(conf-if-eth-2/1)# link-fault-signaling rx on tx off
device(conf-if-eth-2/1)# no shutdown
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# link-oam enable

Enables link oam on an ethernet interface and sets the mode to active or passive.

## Syntax

`link-oam enable [active | passive]`

`no link-oam enable`

## Command Default

Please refer the usage guidelines.

## Parameters

*active*

Configures link-oam in active mode.

*passive*

Configures link-oam in passive mode.

## Modes

Ethernet interface configuration mode

## Usage Guidelines

By default, link oam is disabled on the interface. Once this CLI is configured, it cannot be modified. In order to reconfigure, link-oam has to be deconfigured using **no link-oam enable** command.

## Examples

```
device#configure terminal
device(config)#interface ethernet 1/1
device(config-int-eth1/1)#link-oam enable passive
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# link-oam allow-loopback

Enables an interface to accept remote loopback.

## Syntax

```
link-oam allow-loopback
```

```
no link-oam allow-loopback
```

## Command Default

Please refer the usage guidelines.

## Modes

Ethernet interface configuration mode

## Usage Guidelines

To run this command, link OAM must be configured. By default, loopback is disabled on the interface. The support for this configuration is restricted. The user cannot configure allow-loopback on more than one port per line card. The NO form of the command disables the interface from accepting loopback.

## Examples

```
#configure terminal
(config)#interface ethernet 1/1
(config-int-eth1/1)#link-oam allow-loopback
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# link-oam remote-failure

Blocks the interface on receipt of a remote failure message, in addition to the syslog generation.

## Syntax

```
link-oam remote-failure {link-fault | dying-gasp | critical-event} action block-interface
```

## Command Default

Please refer the usage guidelines.

## Parameters

*link-fault*

Blocks the interface on receipt of a link failure message.

*dying-gasp*

Blocks the interface on receipt of a dying-gasp message.

*critical-event*

Blocks the interface on receipt of a critical event message.

## Modes

Ethernet interface configuration mode

## Usage Guidelines

To run this command, the Link OAM must be configured. By default, on receipt of a remote failure message, the device will only log the event through syslog. This command allows block-interface action to be configured for each of the three events that the protocol supports.

## Examples

```
device(config-int-eth1/1)#link-oam remote-failure link-fault action block-interface
device(config-int-eth1/1)#link-oam remote-failure dying-gasp action block-interface
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# link-oam remote-loop-back

Starts and stops the remote loopback on peer that is connected to a local ethernet interface.

## Syntax

```
link-oam remote-loop-back ethernet slot-number / port-number [ start | stop]
```

## Parameters

*slot-number*

Specifies the slot number.

*port-number*

Specifies the port number.

*start*

Start the remote loopback on peer that is connected to the interface.

*stop*

Stops the remote loopback on peer that is connected to the interface.

## Modes

Exec mode

## Examples

```
device# link-oam remote-loop-back ethernet 1/1 start
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# lldp profile

Applies a Link Layer Discovery Protocol (LLDP) profile to an interface.

## Syntax

**lldp profile** *name*

**no lldp profile**

## Command Default

LLDP profile name.

## Parameters

*name*

Specifies the profile name. Valid profile name length is between 1 and 32 characters.

## Modes

Interface subtype configuration mode

## Usage Guidelines

You must use the **lldp profile** command to create an LLDP profile before you can apply the profile to the interface. Only one LLDP profile can exist at any time for a particular interface. When this command is not present, the parameters defined in the global LLDP configuration are used.

Enter **no lldp profile** to delete the profile from the interface.

## Examples

To apply an LLDP profile called *test* on an specific Ethernet interface:

```
device# configure terminal
device(config)# interface ethernet 0/9
device(conf-if-eth-0/9)# lldp profile test
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# load-sharing

Configures the maximum number of LDP ECMP paths.

## Syntax

```
load-sharing number
no load-sharing
```

## Command Default

The default number of ECMP paths is one.

## Parameters

*number*

Specifies the maximum number of LDP ECMP paths. Enter an integer from 1 to 16.

## Modes

MPLS LDP configuration mode

## Usage Guidelines

The number of LDP ECMP paths for transit LSR depends on the number of eligible paths that are available, and the maximum number of LDP ECMP paths that you can configure.

Use the **no** form of this command to reset the default of one.

## Examples

The following example configures a maximum of four LDP ECMP paths.

```
device# configure terminal
device(config)# router mpls
device(config-router-mpls)# ldp
device(config-router-mpls-ldp)# load-sharing 4
```

## History

Release version	Command history
16r. 1.00	This command was introduced.



# local-as

Specifies the BGP autonomous system number (ASN) where the device resides.

## Syntax

**local-as** *num*

**no local-as** *num*

## Command Default

No ASN is specified.

## Parameters

*num*

The local ASN. The range is from 1 through 4294967295.

## Modes

BGP configuration mode

## Usage Guidelines

ASNs in the range from 64512 through 65535 are private numbers that are not advertised to the external community.

The **no** form of the command removes the ASN from the device.

## Examples

This example assigns a separate local AS number.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# local-as 777
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# local-switching

Configures the local switching mode for a bridge domain.

## Syntax

`local-switching`  
`no local-switching`

## Command Default

Local switching is enabled.

## Parameters

`local-switching`  
 Enables local switching.

## Modes

Bridge-domain configuration mode.

## Usage Guidelines

Local switching allows packets to be switched within a VPLS bridge domain. This command only applies to multipoint-service bridge domains; that is, bridge domains configured with the **p2mp** option.

The **no** form of the command disables local switching in a VPLS bridge domain.

To avoid receipt of traffic with different VLAN tags on local endpoints in a bridge domain that has a PW profile with VC mode set to **raw-passthrough**, it is recommended that local switching is disabled. Raw passthrough mode is designed to forward packets between two VPLS peer devices and is not intended for use with local switching.

## Examples

The following example disables local switching in VPLS bridge domain 10.

```
device# configure terminal
device(config)# bridge-domain 10
device(config-bridge-domain-10)# no local-switching
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# log (OSPFv2)

Controls the generation of OSPFv2 logs.

## Syntax

```
log { adjacency [ dr-only ] | all | bad-packet [ checksum ] | database | retransmit }
no log { adjacency [ dr-only ] | all | bad-packet [ checksum ] | database | retransmit }
```

## Command Default

Only OSPFv2 messages indicating possible system errors are logged.

## Parameters

### adjacency

Specifies the logging of essential OSPFv2 neighbor state changes.

### dr-only

Specifies the logging of essential OSPF neighbor state changes where the interface state is designated router (DR).

### all

Specifies the logging of all syslog messages.

### bad-packet

Specifies the logging of bad OSPFv2 packets.

### checksum

Specifies all OSPFv2 packets that have checksum errors.

### database

Specifies the logging of OSPFv2 LSA-related information.

### retransmit

Specifies the logging of OSPFv2 retransmission activities.

## Modes

OSPF router configuration mode

OSPF VRF router configuration mode

## Usage Guidelines

Use this command to disable or re-enable the logging of specific events related to OSPFv2. If this command is not enabled only OSPFv2 messages indicating possible system errors are logged.

A limitation with the **dr-only** sub-option is that when a DR/BDR election is underway, OSPF neighbor state changes pertaining to non-DR/BDR routers are not logged. Logging resumes once a DR is elected on that network.

The **no** form of this command restores the default.

## Examples

The following example enables the logging of all OSPFv2-related syslog events.

```
device# configure terminal
device(config)# router ospf
device(config-router-ospf-vrf-default-vrf)# log all
```

The following example enables the logging of OSPFv2 retransmission activities.

```
device# configure terminal
device(config)# router ospf
device(config-router-ospf-vrf-default-vrf)# log retransmit
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# log (OSPFv3)

Controls the generation of OSPFv3 logs.

## Syntax

```
log { adjacency [ dr-only ] | all | bad-packet [ checksum ] | database | retransmit }
no log { adjacency | all | bad-packet [ checksum ] | database | retransmit }
```

## Command Default

Only OSPFv3 messages indicating possible system errors are logged.

## Parameters

### adjacency

Specifies the logging of essential OSPFv3 neighbor state changes.

### dr-only

Specifies the logging only of designated router (DR) interface adjacency changes.

### all

Specifies the logging of all syslog messages.

### bad-packet

Specifies the logging of bad OSPFv3 packets.

### checksum

Specifies all OSPFv3 packets that have checksum errors.

### database

Specifies the logging of OSPFv3 LSA-related information.

### retransmit

Specifies the logging of OSPFv3 retransmission activities.

## Modes

OSPFv3 router configuration mode

OSPFv3 VRF router configuration mode

## Usage Guidelines

Use this command to disable or re-enable the logging of specific events related to OSPFv3. If this command is not enabled, only OSPFv3 messages indicating possible system errors are logged.

The **no** form of the command restores the default.

## Examples

The following example enables the logging of all OSPFv3-related syslog events.

```
device# configure terminal
device(config)# ipv6 router ospf
device(config-ipv6-router-ospf-vrf-default-vrf)# log all
```

The following example enables the logging of OSPFv3 retransmission activities.

```
device# configure terminal
device(config)# ipv6 router ospf
device(config-ipv6-router-ospf-vrf-default-vrf)# log retransmit
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# log adjacency

Logs changes in the status of an adjacency with another intermediate system (IS).

## Syntax

**log adjacency**

**no log adjacency**

## Command Default

Disabled.

## Modes

IS-IS router configuration mode

## Usage Guidelines

The **no** form of the command disables the logging of adjacency changes.

## Examples

The following example enables logging of adjacency changes.

```
device# configure terminal
device(config)# router isis
device(config-isis-router)# log adjacency
```

The following example disables logging of adjacency changes.

```
device# configure terminal
device(config)# router isis
device(config-isis-router)# no log adjacency
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# logging auditlog class

Activates audit logging for various categories and classes of actions.

## Syntax

**logging auditlog class** *class*

**no logging auditlog class** *class*

## Command Default

CONFIGURATION, FIRMWARE, and SECURITY audit log classes are enabled.

## Parameters

*class*

Specifies the class name of the audit log. Valid classes are CONFIGURATION, FIRMWARE, and SECURITY.

## Modes

Global configuration mode

## Usage Guidelines

The total message storage available is 2048 messages.

Enter **no logging auditlog class** *class* to disable the audit logging for the specified class.

## Examples

To enable a specific audit log class:

```
device# configure terminal
device(config)# logging auditlog class security
device(config)#
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# logging raslog console stop

Temporarily stops displaying RASLog messages on the console.

## Syntax

```
logging raslog console { start | stop [ minutes ] }
```

## Command Default

RASlog messages display on the console

## Parameters

### start

Initiates RASLog messages.

### stop *minutes*

Stops RASLog messages for a designated number of minutes.

## Modes

Privileged EXEC mode

## Usage Guidelines

When stopping or starting RASLog messages, the commands are not configuration commands and therefore are not persistent.

If the command **logging raslog console stop *minutes*** is invoked before the previous time value expires, the latest CLI duration applies.

## Examples

To stop RASLog messages for 1 minute:

```
device# logging raslog console stop 1
Logging message have been blocked on console for 1 minutes
```

To start RASLog messages:

```
device# logging raslog console start
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# logging raslog console

Sets the severity levels for the RASLog console.

## Syntax

`logging raslog console severity`

`no logging raslog console severity`

## Command Default

Severity level is INFO.

## Parameters

*severity*

Specifies the minimum severity level of the message to pass through the filter. Valid values consist of one of the following: INFO, WARNING, ERROR, or CRITICAL. Input values are case-sensitive.

## Modes

Global configuration mode

## Usage Guidelines

The total message storage available is 2048 messages.

## Examples

To reset the RASLog severity levels to the default value.

```
device# configure terminal
device(config)# no logging raslog console
2013/11/14-08:42:57, [RAS-3008], 5348, M2 | Active, INFO, VDX8770-4, Logging messages to console has
been reset by user.
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# logging syslog-client

Configure various parameters used by syslog clients.

## Syntax

```
logging syslog-client localip { CHASSIS_IP }
```

## Parameters

**CHASSIS\_IP**

Uses the Chassis IP address as source IP address in the IP header of syslog messages generated by this device.

## Modes

Global configuration mode

## Examples

Example command for using the chassis IP as the source IP in the IP header of syslog messages, generated by this device.

```
device# configure terminal
device(config)# logging syslog-client localip CHASSIS_IP
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# logging syslog-facility local

Configures the syslog facility.

## Syntax

```
logging syslog-facility local log_level
```

## Command Default

Syslog level is LOG\_LOCAL7.

## Parameters

*log\_level*

Specifies the syslog facility level. Valid log levels include the following: LOG\_LOCAL0, LOG\_LOCAL1, LOG\_LOCAL2, LOG\_LOCAL3, LOG\_LOCAL4, LOG\_LOCAL5, LOG\_LOCAL6, LOG\_LOCAL7

## Modes

Global configuration mode

## Usage Guidelines

Use this command to configure the log level for all error log entries to forward to one or more specified syslog servers. You can configure up to four syslog servers.

## Examples

To configure the syslog facility level:

```
device# configure terminal
device(config)# logging syslog-facility local LOG_LOCAL5
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# logging syslog-server

Configures a switch to forward system messages to specified syslog servers.

## Syntax

```
logging syslog-server ip_address [ secure ] [ port port-num ] [ use-vrf vrf-name ]
no logging syslog-server ip_address [ secure ] [ port port-num ] [ use-vrf vrf-name ]
```

## Parameters

*ip\_address*

Specifies the IP address of the syslog server in IPv4 or IPv6 format.

**secure**

Configures a secure default (port 514) or specified nondefault syslog server port. A secure port number with default values is not shown in the Extreme SLX-OS database.

**port** *port-num*

Specifies a nondefault port. The port range is from 1 through 65535.

**use-vrf** *vrf-name*

Specifies a VRF through which to communicate with the server. See the Usage Guidelines.

## Modes

Global configuration mode

## Usage Guidelines

Use this command to configure a switch to forward all error log entries to the one or more specified servers. You can configure up to four servers.

A secure port number with default values is not shown in the database.

The **certutil import syslogca** command is required for secure syslog to be fully functional.

You can configure up to four syslog servers; this includes all VRFs. You must execute the command for each server.

Use the **no logging syslog-server** command with the optional **use-vrf** keyword to remove the specified IP address VRF.

By default, all management services are enabled on the management VRF ("mgmt-vrf") and the default VRF ("default-vrf").

## Examples

To configure a server IPv4 address to which system messages are sent on a user-specified VRF:

```
device# configure terminal
device(config)# logging syslog-server 192.168.163.233 use-vrf myvrf
device(config-syslog-server-192.168.163.233/myvrf)#
```

To configure a server IPv4 address and specify a VRF with a secure nondefault port, and confirm the configuration:

```
device# configure terminal
device(config)# logging syslog-server 192.168.163.233 use-vrf myvrf secure port 1999
device(config-syslog-server-192.168.163.233/myvrf)# do show running-config logging syslog-server
logging syslog-server 192.168.163.233 use-vrf myvrf
secure port 1999
```

To remove a configured syslog server:

```
device# configure terminal
device(config)# no logging syslog-server 192.168.163.233
```

To remove a syslog nondefault server port and confirm the configuration:

```
device# configure terminal
device(config)# no logging syslog-server 10.17.17.203 secure port 1999
device(config)# do show running-config logging syslog-server
logging syslog-server 10.17.17.203
secure
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# log-dampening-debug

Logs dampening debug messages.

## Syntax

```
log-dampening-debug
no log-dampening-debug
```

## Command Default

This option is disabled.

## Modes

BGP configuration mode

## Usage Guidelines

Use the **no** form of this command to restore the default.

## Examples

The following example logs dampening debug messages.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# log-dampening-debug
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# log invalid-lsp-packets

Logs invalid Link State PDUs (LSPs) packets.

## Syntax

**log invalid-lsp-packets**

**no log invalid-lsp-packets**

## Command Default

Disabled.

## Modes

IS-IS router configuration mode

## Usage Guidelines

The **no** form of the command disables the logging of invalid LSP packets.

## Examples

The following example enables logging of invalid LSP packets.

```
device# configure terminal
device(config)# router isis
device(config-isis-router)# log invalid-lsp-packets
```

The following example disables logging of invalid LSP packets.

```
device# configure terminal
device(config)# router isis
device(config-isis-router)# no log invalid-lsp-packets
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# log-shell

Controls the remote logging of SLXVM Linux shell command activities.

## Syntax

```
log-shell { start | status | stop }
```

## Command Default

By default, the device logs the SLXVM Linux shell access and all commands executed at the SLXVM Linux shell locally.

## Parameters

- start**  
Restarts remote logging.
- status**  
Checks the remote logging status.
- stop**  
Disables remote logging.

## Modes

Privileged EXEC mode

## Usage Guidelines

Changes of the **log-shell stop** and **log-shell start** commands are applicable only on new SLXVM Linux shell sessions.

If you configure a remote Syslog server, the same logs can be seen on this server.

When you disable remote logging, local logging of user activities continues.

## Examples

The following example disables remote logging.

```
device# log-shell stop
```

The following example restarts remote logging.

```
device# log-shell start
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# logical-interface (bridge domain)

Binds a logical interface to a bridge domain.

## Syntax

```
logical-interface { ethernet num | port-channel num }
```

```
logical-interface { ethernet num | port-channel num }
```

## Command Default

No interface is bound to the bridge domain.

## Parameters

**ethernet** *num*

Specifies an instance ID for an Ethernet logical interface.

**port-channel** *num*

Specifies an instance ID for a port-channel logical interface.

## Modes

Bridge-domain configuration mode.

## Usage Guidelines

The attachment circuit end-points (logical interfaces) bound to a bridge domain can be either regular Ethernet interfaces or LAG trunks (port-channels).

A logical interface must be created (by using the **logical interface** command in interface configuration mode) before it can be bound to a bridge domain.

The **no** version of the command removes the logical interface from the bridge domain configuration.

## Examples

The following example shows how to create a logical Ethernet interface instance ID (1/5.10) and bind to bridge domain 4.

```
device# configure terminal
device(config)# interface ethernet 1/5
device(conf-if-eth-1/5)# logical-interface ethernet 1/5.10
device(conf-if-eth-lif-1/5.10)# vlan 50
device(conf-if-eth-lif-1/5.10)# exit

device(config)# bridge-domain 4
device(config-bridge-domain-4)# logical-interface ethernet 1/5.10
```

The following example shows how to bind a logical port-channel interface instance ID (2.200) to bridge domain 4.

```
device# configure terminal
device(config)# bridge-domain 4
device(config-bridge-domain-4)# logical-interface port-channel 2.200
```

The following example shows the error message that displays when an attempt is made to bind a logical interface that was not previously created, to a bridge domain.

```
device# configure terminal
device(config)# bridge-domain 4
device(config-bridge-domain-4)# logical-interface ethernet 1/3.100
Error: Logical Interface not yet created
```

The following example shows the error message that displays when an attempt is made to bind a logical interface that is previously bound to another bridge domain.

```
device>enable
device# configure terminal
device(config)# bridge-domain 4
device(config-bridge-domain-4)# logical-interface ethernet 1/3.100
Error: LIF already Binded
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# loop-detection

Enables the loop detection (LD) feature at the interface level or the VLAN level, and enters Protocol Loop Detection configuration mode.

## Syntax

**loop-detection**

**no loop-detection**

## Command Default

This feature is disabled.

## Modes

Interface subtype configuration mode (Ethernet or port-channel)

VLAN configuration mode

## Usage Guidelines

When configured at the interface level, this command applies to LD strict mode.

When configured at the VLAN level, this command is applied to all ports in the VLAN.

Use the **no** form of this command to disable loop detection at the interface or VLAN level.

## Examples

To enable loop detection on an Ethernet interface and enter Protocol Loop Detection configuration mode:

```
device# configure terminal
device(config)# interface ethernet 2/6
device(config-if-eth-2/6)# loop-detection
device(config-loop-detect)#
```

To disable loop detection on an Ethernet interface:

```
device# configure terminal
device(config)# interface ethernet 2/6
device(config-if-eth-2/6)# no loop-detection
```

To enable loop detection on a port-channel interface and enter Protocol Loop Detection configuration mode:

```
device# configure terminal
device(config)# interface port-channel 20
device(config-port-channel-20)# loop-detection
device(config-loop-detect)#
```

To enable loop detection on a VLAN and enter Protocol Loop Detection configuration mode:

```
device# configure terminal
device(config)# vlan 5
device(config-vlan-5)# loop-detection
device(config-loop-detect)#
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# loop-detection shutdown-disable

Disables the shutting down of an interface (Ethernet or port-channel) as a result of the loop detection (LD) protocol.

## Syntax

**loop-detection shutdown-disable**

**no oop-detection shutdown-disable**

## Command Default

This feature is disabled.

## Modes

Interface subtype configuration mode (Ethernet or port-channel)

## Usage Guidelines

Use the **no** form of this command. to revert to default behavior. (LD protocol shuts down the interface.)

## Examples

To disable the shutdown of an Ethernet interface as a result of LD protocol:

```
device# configure terminal
device(config)# interface ethernet 2/6
device(conf-if-eth-2/6)# loop-detection shutdown-disable
```

To revert to default behavior:

```
device# configure terminal
device(config)# interface ethernet 2/6
device(conf-if-eth-2/6)# no loop-detection shutdown-disable
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# loop-detection vlan

Associates a VLAN at the interface level to support the loop detection (LD) protocol.

## Syntax

```
loop-detection vlan vlan-id
```

```
no loop-detection vlan
```

## Command Default

This feature is disabled.

## Parameters

*vlan-id*

Specifies a created VLAN. Range is from 1 through 4090.

## Modes

Interface subtype configuration mode (Ethernet or port-channel)

## Usage Guidelines

The VLAN must already be created.

This command applies to LD loose mode.

The **no** form of this command deletes LD support for all previously configured VLANs, deleting all LD configurations at the interface level.

## Examples

To associate a VLAN to an Ethernet interface for LD support:

```
device# configure terminal
device(config)# interface ethernet 2/6
device(conf-if-eth-2/6)# loop-detection vlan 20
```

To disassociate all previously configured VLANs from an Ethernet interface for LD support and delete all LD configurations at the Ethernet interface level:

```
device# configure terminal
device(config)# interface ethernet 2/6
device(conf-if-eth-2/6)# no loop-detection vlan 20
```

## History

Release version	Command history
17r.1.00	This command was introduced.



# lsp

Accesses LSP subconfiguration mode to configure the LSP tunnel.

## Syntax

**lsp** *name*

**no lsp** *name*

## Parameters

*name*

Specifies the name of the LSP tunnel.

## Modes

MPLS configuration mode

## Usage Guidelines

Use the **no** form of this command to remove the LSP from the MPLS configuration.

## Examples

The following example configures LSP to2 and accesses LSP subconfiguration mode.

```
device# configure terminal
device(config)# router mpls
device(config-router-mpls)# lsp to2
device(config-router-mpls-lsp-to2)#
```

## History

Release version	Command history
16r. 1.00	This command was introduced.

# lsp-gen-interval

Sets the minimum number of seconds the device waits between sending updated Link State PDUs (LSPs) to its Intermediate System-to-Intermediate System (IS-IS) neighbors.

## Syntax

`lsp-gen-interval interval`

`no lsp-gen-interval interval`

## Command Default

The default interval is 10 seconds.

## Parameters

*secs*

Specifies the interval in seconds. Valid values range from 0 through 120 seconds. The default is 10 seconds.

## Modes

IS-IS router configuration mode

## Usage Guidelines

The **no** form of the command removes the configured interval.

## Examples

The following example changes the LSP generation interval to 45 seconds.

```
device# configure terminal
device(config)# router isis
device(config-isis-router)# lsp-gen-interval 45
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# lsp-interval

Sets the rate of transmission, in milliseconds, of the Link State PDUs (LSPs).

## Syntax

**lsp-interval** *interval*

**no lsp-interval** *interval*

## Command Default

The default interval is 33 milliseconds.

## Parameters

*secs*

Specifies the interval in milliseconds. Valid values range from 1 through 4294967295 milliseconds. The default is 33 milliseconds.

## Modes

IS-IS router configuration mode

## Usage Guidelines

The **no** form of the command removes the configured interval.

## Examples

The following example changes the LSP interval to 45 milliseconds.

```
device# configure terminal
device(config)# router isis
device(config-isis-router)# lsp-interval 45
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# lsp-refresh-interval

Sets the maximum number of seconds a device waits between sending updated Link State PDUs (LSPs) to its Intermediate System-to-Intermediate System (IS-IS) neighbors.

## Syntax

```
lsp-refresh-interval interval
no lsp-refresh-interval interval
```

## Command Default

The default interval is 900 seconds (15 minutes).

## Parameters

*secs*

Specifies the interval in seconds. Valid values range from 1 through 65535 seconds. The default is 900 seconds.

## Modes

IS-IS router configuration mode

## Usage Guidelines

The **no** form of the command removes the configured interval.

## Examples

The following example changes the LSP refresh interval to 20000 seconds.

```
device# configure terminal
device(config)# router isis
device(config-isis-router)# lsp-refresh-interval 20000
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# lsr-id

Configures an IP address to be used as the LSR ID for the LDP identifier.

## Syntax

```
lsr-id ip_addr
```

```
no lsr-id ip_addr
```

## Command Default

The LSR-ID is the first available loopback interface address.

## Parameters

*ip\_addr*

Specifies the IP address to assign to the LSR identifier.

## Modes

MPLS LDP configuration mode

## Usage Guidelines

You can configure only an IPv4 address.

Use the **no** form of the command to reset the default behavior. When you enter the **no** form of the command and LDP protocol is in the enabled state, the device uses the same LSR-ID until the LDP protocol is disabled; the IP address selected as LSR-ID for the LDP protocol is still valid and is the operationally UP IP address on an enabled loopback interface.

When you enter the **no** form of the command and LDP protocol is in the disabled state (this happens when the loopback interface on which IP address is configured is in the disabled state), the device falls back to default behavior which tries to enable LDP protocol when it finds a valid IP address on any one of the enabled loopback interfaces.

## Examples

The following example configures an IP address for the LSR identifier.

```
device# configure terminal
device(config)# router mpls
device(config-router-mpls)# ldp
device(config-router-mpls-ldp)# lsr-id 10.22.22.22
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# mac access-list extended

Creates a MAC extended access control list (ACL).

## Syntax

`mac access-list extended ACL-name`

`no mac access-list extended ACL-name`

## Parameters

*ACL-name*

Specifies an ACL name unique among all ACLs (Layer 2 and Layer 3). The name can be up to 63 characters in length, and must begin with an alphanumeric character. No special characters are allowed, except for the underscore (`_`) and hyphen (`-`).

## Modes

Global configuration mode

## Usage Guidelines

If the ACL is already created, this command puts the device in MAC extended ACL configuration mode.

An extended ACL contains rules that permit or deny traffic according to source and destination addresses, as well as other parameters. Extended ACLs allow you to filter traffic based on the following:

- Source MAC address
- Destination MAC address
- EtherType

You can apply MAC extended ACLs to VLANs and to Layer 2 interfaces.

To enable ARP Guard, you also use a MAC extended ACL.

The **no** form of the command removes a MAC extended ACL from an interface.

## Examples

The following example creates a MAC extended ACL named `mac1`.

```
device(config)# mac access-list extended mac1
```

The following example deletes a MAC extended ACL named `mac1`.

```
device(conf-mac1-ext)# no mac access-list extended mac1
```

## History

Release version	Command history
16r.1.00	This command was introduced.
17r.1.00	This topic was modified to support ARP Guard.

# mac access-list standard

Creates a standard MAC access control list (ACL). Standard ACLs contain rules that permit or deny traffic based on source addresses that you specify.

## Syntax

```
mac access-list standard ACLname
no mac access-list standard ACLname
```

## Parameters

*ACLname*

Specifies an ACL name unique among all ACLs (Layer 2 and Layer 3). The name can be up to 63 characters in length, and must begin with an alphanumeric character. No special characters are allowed, except for the underscore and hyphen.

## Modes

Global configuration mode

## Usage Guidelines

Use this command to create a standard MAC access list. If ACL is already created, this command puts the device in the standard MAC access-list configuration mode.

To remove a MAC ACL from an interface, enter the **no** form of this command.

## Examples

The following command creates a MAC standard ACL named mac1.

```
device(config)# mac access-list standard mac1
device(conf-macl-std)#
```

The following command deletes a MAC standard ACL named mac1.

```
device(conf-macl-std)# no mac access-list standard mac1
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# mac-address withdrawal

In a VPLS context on a bridge domain (BD), removes MAC addresses that have been dynamically learned, thus providing faster convergence.

## Syntax

`mac-address withdrawal`

`no mac-address withdrawal`

## Command Default

MAC address withdrawal is disabled.

## Modes

Bridge-domain configuration mode

## Usage Guidelines

A MAC address withdrawal message is sent with a MAC list Type Length Value (TLV). 200 MAC addresses are bulked and sent in one MAC TLV message.

### NOTE

The MAC withdrawal support is only for explicit MAC addresses in a MAC withdrawal TLV. An empty MAC list, as well as the sending of a MAC withdrawal TLV to a specific subset of peers, is not supported.

The maximum number of MAC addresses supported is 5000 in a 5-second interval. The remaining MAC addresses in the attachment circuit (AC) logical interface (LIF) are not sent. After the 5-second interval, another LIF "down" event triggers a MAC withdrawal message for a new-5 second interval.

MAC withdrawal is supported for both VPLS and MCT-VPLS. MPLS signals the MAC withdraw TLV to all the peers.

Use the **no** form of this command to disable MAC address withdrawal.

## Examples

The following example enables MAC address withdrawal on a BD.

```
device# configure terminal
device(config)# bridge-domain 10
device(config-bridge-domain-10)# mac-address withdrawal
```

The following example illustrates output of the **show bridge-domain** command confirming that withdrawal is enabled.

```
device# show bridge-domain
Bridge-domain 1
-----
Bridge-domain Type: MP , VC-ID: 0
Number of configured end-points: 0 , Number of Active end-points: 0
VE if-indx: 0, Local switching: TRUE, bpdu-drop-enable: TRUE
MAC Withdrawal: Enabled
PW-profile: default, mac-limit: 0
Total VPLS peers: 0 (0 Operational):
```

## History

Release version	Command history
17r.1.01	This command was introduced.

# mac-address-table aging-time

Configures the aging time for dynamic MAC address entries in the MAC address table.

## Syntax

```
mac-address-table aging-time { 0 | 60..86400 }
no mac-address-table aging-time { 0 | 60..86400 }
```

## Command Default

Default aging time is 300 seconds.

## Parameters

**aging-time** *seconds*

0 - Specifies to disable MAC address aging. Valid aging time values are from 60 through 86400 seconds.

## Modes

Global configuration mode

## Usage Guidelines

MAC address aging configuration per VLAN is not supported.

The **no** form of the command restores the default value.

## Examples

The following example configures the MAC aging period as 400 seconds.

```
device# configure terminal
device(config)# mac-address-table aging-time 400
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# maid-format

Sets the Maintenance Association Identifier (MAID) format for a particular maintenance association (MA).

## Syntax

```
maid format [ long | default ]
```

## Command Default

The default maid format is short.

## Parameters

### long

Specifies maid format as long.

### default

Specifies maid format as default.

## Modes

Global configuration mode

## Usage Guidelines

The **no** form of this command reverts back the maid format to **short**.

You cannot change the MAID format after a MEP is configured under an MA. You must first delete the MEP and then change the MAID format.

## Examples

The following example sets the MAID format to long.

```
device# configure terminal
device(config)# protocol cfm
device(config-cfm)# domain name md1 level 4
device(config-cfm-md-md1)# ma-name mal id 30 vlan-id 30 priority 7
device(config-cfm-md-md1)# maid-format long
```

## History

Release version	Command history
17r.1.01	This command was introduced.

## ma-name

Creates a maintenance association (MA) within a specified domain. The command changes the maintenance domain mode to the specified maintenance association mode.

### Syntax

```
ma-name ma-name [ id ma-id ] [ vlan-id vlan-id ] [ bridge-domain bridge-domain ] { priority priority }
no ma-name ma-name
```

### Command Default

There are no MA configured.

### Parameters

#### ma-name

Specifies the maintenance association name. The name attribute is case-sensitive.

#### ma-id

Specifies the short maid that is transmitted in the CCM PDU. This ID is unique. The range is 1 - 4090.

#### vlan-id

Specifies a unique VLAN identifier of the maintenance association in the range 1-4090. To create a MA, a vlan id must be set.

#### bridge-domain

Specifies a unique L2VPN domain of the maintenance association. This option supports only Virtual Private LAN Services (VPLS) in this release. VLL is not currently supported for CFM.

#### priority

Specifies the priority of the CCM messages sent by MEPs, in the range 0-7.

### Modes

CFM protocol configuration mode

### Usage Guidelines

The **no** form of the command removes the maintenance association.

### Examples

This example demonstrates associating the MA "ma1" to VLAN 30.

```
device# configure terminal
device(config)# protocol cfm
device(config-cfm)# domain name md1 level 4
device(config-cfm-md-md1)# ma-name ma1 id 1 vlan-id 30 priority 4
device(config-cfm-md-ma-ma1)#
```

## History

Release version	Command history
16r.1.01	This command was introduced.

# map bridge-domain (overlay gateway)

Maps a bridge domain (BD) to a Virtual Network Identifier (VNI) for a VXLAN overlay gateway.

## Syntax

**map bridge-domain** *bridge\_domain\_id* **vni** *vni*

**no map bridge-domain** *bridge\_domain\_id* **vni** *vni*

## Parameters

*bridge\_domain\_id*

Specifies a bridge domain. Enter an integer from 1 through 4096.

**vni** *vni*

Specifies a VNI. Enter an integer from 1 through 16777215.

## Modes

Overlay gateway configuration mode

## Usage Guidelines

Use the **no** form of this command to remove the mapping.

## Examples

The following example maps a bridge domain to a VNI.

```
device# configure terminal
device(config)# overlay-gateway gateway1
device(config-overlay-gw-gateway1)# map bridge-domain 1 vni 999
```

## History

Release version	Command history
17r.1.01	This command was introduced.

## map dscp

Maps an ingress DSCP value to an outbound CoS, DSCP, or traffic-class value for a QoS DSCP-to-CoS, DSCP-mutation, or DSCP-to-traffic class map.

### Syntax

```
map dscp dscp-value to { cos cos-value } | { dscp dscp-out } | { traffic-class tc-value }
no map dscp dscp-value
```

### Command Default

The default values for DSCP to CoS, DSCP mutation, or DSCP to traffic class mapping.

### Parameters

*dscp-value*

Specifies the ingress DSCP value or range. Enter an integer from 0 to 63.

**cos** *cos-value*

Specifies the outbound CoS value. Enter an integer from 0 to 7.

**dscp** *dscp-out*

Specifies the outbound DSCP value or range. Enter an integer from 0 to 63.

**traffic-class** *tc-value*

Specifies the outbound Traffic Class value. Enter an integer from 0 to 7.

### Modes

DSCP CoS configuration mode

DSCP mutation configuration mode

DSCP traffic-class configuration mode

### Usage Guidelines

Use the **no** form of the command to reset the default mapping values.

### Examples

In DSCP COS configuration mode, the following example maps an ingress DSCP value to an egress CoS value.

```
device# configure terminal
device(config)# qos map dscp-cos test
device(dscp-cos-test)# map dscp 43 to cos 4
```



In DSCP mutation configuration mode, the following example maps the ingress DSCP values to an egress DSCP value.

```
device# configure terminal
device(config)# qos map dscp-mutation test
device(dscp-mutation-test)# map dscp 1,3,5,7 to dscp 40
```

In DSCP traffic configuration mode, the following example maps the ingress DSCP values to a traffic class.

```
device# configure terminal
device(config)# qos map dscp-traffic-class test
device(dscp-traffic-class-test)# map dscp 1,3,5,7 to traffic-class 1
```

## History

Release version	Command history
16r.1.00	This command was introduced.

## map vlan

In a VXLAN overlay gateway configuration that uses Layer 2 extension, associates VLANs with VXLAN Network Identifiers (VNIs).

### Syntax

```
map vlan [ vlan_id ] { vni } [ vni ] [ auto ]
```

```
no map vlan vlan_id
```

```
no map vlan vni
```

### Parameters

*vlan\_id*

A single VLAN ID or range of VLAN IDs. The range is from 1 through 8191. See the Usage Guidelines.

**vni**

Specifies the VNI (VXLAN Network Identifier) token.

*vni*

A single VXLAN VNI or range of VXLAN VNIs. Range is from 1 through 16777215. See the Usage Guidelines.

**auto**

Enables automatic VLAN-to-VNI mapping for every VLAN associated with the tunnel.

### Modes

VXLAN overlay gateway configuration mode

### Usage Guidelines

Note the following conditions:

- Before using this command, you must first set the VXLAN overlay gateway to **layer2-extension**, by means of the **type** command.
- Before using this command, you must first configure the appropriate VLANs to be used by the gateway.
- Before mapping VLANs to VNIs manually, you cannot have automatic mapping configured (by means of the **map vlan vni auto** command).
- You cannot map one VLAN to multiple VNIs. Similarly, you cannot map a single VNI to multiple VLANs. For example, VLAN-to-VNI mapping should be one to one.
- A single VLAN ID and a range of VLAN IDs can both be specified in a single command as follows: *x,y-z*. The same applies to VNIs.
- When using ranges, you must ensure that the number of values in a VLAN ID range corresponds to the number of values in a VNI range.
- The **no** forms of this command are allowed only if no VLANs are referenced by means of the **extend vlan** command (under a submode of the **site** command). For example, VLANs extended to a site should have a VNI mapping.

- The **no map vlan vni auto** command disables the automatic assignment of VNIs. It is not allowed if manual VLAN-to-VNI mappings have been configured. For example, "auto" VLAN-to-VNI mapping and "explicit" VLAN-to-VNI mapping are mutually exclusive.
- The **no map vlan vlan\_id** command removes the VNI mappings for one or more VLANs.
- You cannot delete a VLAN (by means of the **no interface vlan** command) that is referenced by means of the **map vlan vni** command.
- This command does not trigger VLAN provisioning, unlike the behavior of the **attach vlan** command.

## Examples

To configure a manual mapping of VLANs to VNIs in "gateway1":

```
switch(config)# overlay-gateway gateway1
switch(config-overlay-gw-gateway1)# map vlan 10,20-22 vni 5000-5002,6000
```

This results in the following in the running configuration:

```
overlay-gateway gateway1
  type layer2-extension mode vxlan-ipv4
  map vlan 10 vni 5000
  map vlan 20 vni 5001
  map vlan 21 vni 5002
  map vlan 22 vni 6000
```

To configure an automatic mapping of VLANs to VNIs in "gateway1":

```
switch(config)# overlay-gateway gateway1
switch(config-overlay-gw-gateway1)# map vlan vni auto
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# master-vlan (STP)

Selects a master VLAN for a topology group.

## Syntax

```
master-vlan vlan_id
```

## Command Default

The master VLAN is not configured.

## Parameters

*vlan\_id*

The master VLAN ID.

## Modes

Topology group configuration mode.

## Usage Guidelines

To configure a master VLAN, the VLAN must already be configured. The master VLAN contains the STP settings for all the VLANs in the STP per VLAN group. An STP group can have only one master VLAN. If you add a new master VLAN to an STP group that already has a master VLAN, the new master VLAN replaces the older master VLAN.

If you remove the master VLAN (by entering the **no master-vlan** command), the software selects the new master VLAN from member VLANs. A new candidate master VLAN will be in configured as a member VLAN so that the first added member VLAN will be a new candidate master VLAN. Once you save and reload, a member VLAN with the youngest VLAN ID will be the new candidate master.

## Examples

The following example adds the member VLANs to the STP topology group.

```
device# configure terminal
device(config)# topology-group 10
device(config-topo-group-10)# master-vlan 15
```

## History

Release version	Command history
16r.1.01	This command was introduced.

# match (route map)

Defines a variety of match conditions for a route map.

## Syntax

```

match as-path name
match community name exact-match ]
match extcommunity number
match interface { ethernet slot / port | loopback num | ve-interface vlan_id }
match ip address { acl name [ prefix-list string ] | prefix-list string [ acl name ] }
match ip next-hop prefix-list string
match ip route-source prefix-list string
match ipv6 next-hop prefix-list string
match ipv6 route-source prefix-list string
match metric num
match protocol bgp { external | internal | static-network }
match protocol static
match route-type { internal | type-1 | type-2 }
match tag num
match vrf name
no match as-path
no match community
no match extcommunity
no match interface
no match ip address
no match ip next-hop
no match ip route-source
no match ipv6 address
no match ipv6 next-hop
no match ipv6 route-source
no match metric
no match protocol
no match route-type
no match tag

```

## Command Default

This option is disabled.

## Parameters

### *as-path*

Matches an AS-path access list name in a route-map instance.

#### *name*

Name of an AS-path access list. Range is from 1 through 32 ASCII characters.

### **community**

Matches a BGP community access list name in a route-map instance.

#### *name*

Name of a BGP community access list. Values range from 1 through 32 ASCII characters.

### **exact-match**

Matches a route only if the route community attributes field contains the same community numbers specified in the **match** statement.

### **extcommunity** *number*

Matches a BGP extended community list in a route-map instance and specifies an extended community list number. Valid values range from 1 through 99.

### **interface**

Matches interface conditions in a route-map instance.

### **ethernet**

Specifies an ethernet interface.

#### *slot*

Specifies a valid slot number.

#### *port*

Specifies a valid port number.

### **loopback** *num*

Specifies a loopback interface.

### **ve-interface** *vlan\_id*

Specifies a virtual Ethernet VLAN interface.

### **ip address**

Matches an IP address in a route-map instance.

#### **acl** *name*

Name of the access list. Range is from 1 through 32 ASCII characters.

#### **prefix-list** *string*

Specifies an IP prefix list. Range is from 1 through 32 ASCII characters.

### **ip next-hop**

Matches IP next-hop match conditions in a route-map instance.

### **ip route-source**

Matches an IP route source in a route-map instance.

**ipv6 address**

Matches an IPv6 address in a route-map instance.

**ipv6 next-hop**

Matches IPv6 next-hop match conditions in a route-map instance.

**ipv6 route-source**

Matches an IPv6 route source in a route-map instance.

**metric *num***

Matches a route metric in a route-map instance. Values range from 0 through 4294967295.

**protocol bgp external**

Matches on BGP routes.

**protocol bgp internal**

Matches on iBGP routes.

**protocol bgp static-network**

Matches on BGP4 static network routes. This is applicable only for BGP outbound policy.

**protocol static**

Matches on static routes.

**route-type**

Matches a route type in a route-map instance.

**internal**

Internal route type

**type-1**

OSPF external route type 1

**type-2**

OSPF external route type 2

**tag *tag-value***

Specifies a route tag and route tag value.

**vrf *name***

Specifies a non-default VRF. Valid values range from 0 through 4294967295.

## Modes

Route-map configuration mode

## Usage Guidelines

The **no** form of the command restores the default.

## Examples

The following example matches AS-path ACL 1 in route-map instance "myroutes".

```
device#configure terminal
device(config)# route-map myroutes permit 10
device(config-route-map myroutes/permit/10)# match as-path 1
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# match access-group

Matches an ACL to a class map.

## Syntax

```
match access-group name
```

## Parameters

*name*

The ACL name.

## Modes

Class map configuration mode.

## Usage Guidelines

The command is used after the **class-map** command is entered.

## Examples

Use this command to match an ACL to a class map.

```
device(config)# class-map default  
device(config-classmap)# match access-group class_acl
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# match bridge-domain

Matches a bridge domain to a class map.

## Syntax

```
match bridge-domain BD-number
```

## Parameters

*BD-number*

Specifies a valid bridge-domain number.

## Modes

Class map configuration mode.

## Usage Guidelines

The command is used after the **class-map** command is entered.

## Examples

The following example matches a bridge domain to a class map.

```
device(config)# class-map BD-1000
device(config-classmap)# match bridge-domain 1000
```

## History

Release version	Command history
17r.1.01	This command was introduced.

# match community

Matches a community access list name in a route-map instance.

## Syntax

`match community name`

`no match community`

## Parameters

*name*

Name of a community access list. Values range from 1 through 32 ASCII characters.

## Modes

Route-map configuration mode

## Usage Guidelines

Enter `no match community name` to disable this feature.

You can configure up to five match community directives within a single stanza.

## Examples

Typical command example:

```
device# config terminal
device(config)# route-map myroutes permit 10
device(config-route-map myroutes/permit/10)# match community ABCPath
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# match extcommunity

Matches an extended community list in a route-map instance.

## Syntax

```
match extcommunity number
no match extcommunity
```

## Command Default

BGP extended community access list names are not matched.

## Parameters

*name*

Extended community list number. Values range from 1 through 99.

## Modes

Route-map configuration mode.

## Usage Guidelines

Enter **no match extcommunity** to remove the community match statement from the configuration file.

You can configure up to five match extcommunity directives within a single stanza.

## Examples

To configure a route map that matches on extended community ACL 1.

```
device# configure terminal
device(config)# ip extcommunity-list 1 permit 123:2
device(config)# route-map extComRmap permit 10
device(config-route-map-extComRmap/permit/10)# match extcommunity 1
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# match vlan

Matches a VLAN to a class map.

## Syntax

```
match vlan VLAN-number
```

## Parameters

*VLAN-number*

Specifies a valid VLAN number.

## Modes

Class map configuration mode.

## Usage Guidelines

The command is used after the **class-map** command is entered.

## Examples

The following example matches a VLAN to a class map.

```
device(config)# class-map p2
device(config-classmap)# match vlan 500
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# maxas-limit

Imposes a limit on the number of autonomous systems in the AS-PATH attribute.

## Syntax

`maxas-limit in num`

`no maxas-limit in`

## Command Default

Disabled.

## Parameters

`in`

Allows an AS-PATH attribute from any neighbor to impose a limit on the number of autonomous systems.

`num`

Range is from 0 through 300. The default is 300.

## Modes

BGP configuration mode

## Usage Guidelines

Use the `no` form of this command to restore the default.

## Examples

This example sets the limit on the number of BGP4 autonomous systems in the AS-PATH attribute to 100.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv4 unicast
device(config-bgp-ipv4u)# maxas-limit in 100
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# maximum-paths (BGP)

Sets the maximum number of BGP4 and BGP4+ shared paths.

## Syntax

```
maximum-paths num | use-load-sharing
no maximum-paths
```

## Command Default

Disabled.

## Parameters

*num*

Specifies the maximum number of paths across which the device balances traffic to a given BGP destination. Valid values range is from 1 through 64. The default is 1.

**use-load-sharing**

Uses the maximum IP ECMP path value supported (64) without enabling BGP level ECMP.

## Modes

BGP address-family IPv4 unicast configuration mode

BGP address-family IPv6 unicast configuration mode

BGP address-family IPv4 unicast VRF configuration mode

BGP address-family IPv6 unicast VRF configuration mode

## Usage Guidelines

Use this command to change the maximum number of BGP4 shared paths, either by setting a value or using the maximum IP ECMP path value supported (64) without enabling BGP level ECMP.

If the configured *num* value is less than the possible number of ECMP paths available, BGP routes may not take the same number of ECMP paths. The set of ECMP paths may not be the same for different prefixes.

The **no** form of the command restores the default.

## Examples

This example sets the maximum number of BGP4 shared paths to 8.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv4 unicast
device(config-bgp-ipv4u)# maximum-paths 8
```

This example sets the maximum number of BGP4+ shared paths to 64 without enabling BGP level ECMP.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv6 unicast
device(config-bgp-ipv6u)# maximum-paths use-load-sharing
```

This example sets the maximum number of BGP shared paths to 2 in a nondefault VRF instance in the IPv6 address family.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv6 unicast vrf red
device(config-bgp-ipv6u-vrf)# maximum-paths 2
```

## History

Release version	Command history
16r.1.00	This command was introduced.



## maximum-paths (IS-IS)

Specifies the number of paths Intermediate System-to-Intermediate System (IS-IS) can calculate and install in the IPv4 or IPv6 forwarding table.

### Syntax

`maximum-paths number`

`no maximum-paths number`

### Command Default

The default is 8 paths.

### Parameters

*value*

Specifies the number of paths. Valid values range from 1 through 64 paths. The default is 8.

### Modes

IS-IS address-family IPv4 unicast configuration mode

IS-IS address-family IPv6 unicast configuration mode

### Usage Guidelines

The **no** form of the command resets number of paths to the default number of 8.

### Examples

The following example specifies that the number of paths IS-IS can calculate and install in the IP forwarding table is 10.

```
device# configure terminal
device(config)# router isis
device(config-isis-router)# address-family ipv4 unicast
device(config-router-isis-ipv4u)# maximum-paths 10
```

The following example resets the number of paths IS-IS can calculate and install in the IPv6 forwarding table to 8 (the default).

```
device# configure terminal
device(config)# router isis
device(config-isis-router)# address-family ipv6 unicast
device(config-router-isis-ipv6u)# no maximum-paths
```

### History

Release version	Command history
16r.1.00	This command was introduced.

# maximum-paths (OSPF)

Changes the maximum number of OSPF shared paths.

## Syntax

**maximum-paths** *num*

**no maximum-paths**

## Parameters

*num*

Maximum number of paths across which the device balances traffic to a given OSPF destination. The range is from 1 through 64. The default is 8.

## Modes

OSPF router configuration mode

OSPFv3 router configuration mode

OSPF router VRF configuration mode

OSPFv3 router VRF configuration mode

## Usage Guidelines

The **no** form of the command restores the default.

## Examples

The following example sets the maximum number of shared paths to 22.

```
device# configure terminal
device(config)# router ospf
device(config-router-ospf-vrf-default-vrf)# maximum-paths 22
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# maximum-paths ebgp ibgp

Specifies the number of equal-cost multipath eBGP or iBGP routes or paths that are selected.

## Syntax

```
maximum-paths { ebgp num | ibgp num }  
no maximum-paths
```

## Command Default

This option is disabled.

## Parameters

<b>ebgp</b>	Specifies eBGP routes or paths.
<b>ibgp</b>	Specifies iBGP routes or paths.
<i>num</i>	The number of equal-cost multipath routes or paths that are selected. Range is from 1 through 64. 1 disables equal-cost multipath.

## Modes

BGP address-family IPv4 unicast configuration mode  
BGP address-family IPv6 unicast configuration mode  
BGP address-family IPv4 unicast VRF configuration mode  
BGP address-family IPv6 unicast VRF configuration mode

## Usage Guidelines

Use the **no** form of this command to restore the default.

Enhancements to BGP load sharing support the load sharing of BGP4 and BGP4+ routes in IP Equal-Cost Multipath (ECMP), even if the BGP multipath load-sharing feature is not enabled by means of the **use-load-sharing** option for the **maximum-paths** command. You can set separate values for IGMP and ECMP load sharing. Use this command to specify the number of equal-cost multipath eBGP or iBGP routes or paths that are selected.

## Examples

This example sets the number of equal-cost multipath eBGP routes or paths that will be selected to 6 in the IPv4 address family.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv4 unicast
device(config-bgp-ipv4u)# maximum-paths ebgp 6
```

This example sets the number of equal-cost multipath iBGP routes or paths that will be selected to 4 in the IPv6 address family.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv6 unicast
device(config-bgp-ipv6u)# maximum-paths ibgp 4
```

This example sets the number of equal-cost multipath EBGP routes or paths that will be selected to 3 for the IPv4 address family for VRF instance "red".

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv4 unicast vrf red
device(config-bgp-ipv4u-vrf)# maximum-paths ebgp 3
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# max-age

Sets the interval time in seconds between messages that the spanning tree receives from the interface.

## Syntax

**max-age** *seconds*

**no max-age**

## Command Default

20 seconds.

## Parameters

*seconds*

Configures the STP interface maximum age. Valid values range from 6 through 40.

## Modes

Spanning tree configuration mode

## Usage Guidelines

Use this command to control the maximum length of time that passes before an interface saves its configuration Bridge Protocol Data Unit (BPDU) information.

If the **vlan** parameter is not provided, the *seconds* value is applied globally for all per-VLAN instances. However, for VLANs that have been configured explicitly, the per-VLAN configuration takes precedence over the global configuration.

When configuring the maximum age, the **max-age** command setting must be greater than the **hello-time** command setting. The following relationship should be kept:

$$(2 \times (\text{forward-delay} - 1)) \geq \text{max-age} \geq (2 \times (\text{hello-time} + 1))$$

Enter **no max-age** to return to the default configuration.

## Examples

To configure the maximum age to 10 seconds:

```
device# configure terminal
device(config)# protocol spanning-tree stp
device(conf-stp)# max-age 10
```

```
device# configure terminal
device(config)# protocol spanning-tree rstp
device(conf-rstp)# max-age 10
```

```
device# configure terminal
device(config)# protocol spanning-tree mstp
device(conf-mstp)# max-age 10
```

```
device# configure terminal
device(config)# protocol spanning-tree pvst
device(conf-pvst)# max-age 10
```

```
device# configure terminal
device(config)# protocol spanning-tree rpvt
device(conf-rpvt)# max-age 10
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# max-bypasses

Use the **max-bypasses** command to configure the maximum number of dynamic bypass LSPs that can be created in the system or on a MPLS interface.

## Syntax

```
max-bypasses { max_bypass_count }
no max-bypasses { max_bypass_count }
```

## Command Default

The default value is 250.

## Parameters

*max\_bypass-count*

This number must be less than or equal to the global maximum number of bypass LSPs; that is, the total amount of static bypasses and dynamic bypasses that can be configured on a router or on an interface. The value can be between 1 and 500.

## Modes

MPLS router dynamic bypass configuration mode (config-router-mpls-dynamic-bypass).

MPLS router MPLS interface dynamic bypass configuration mode (config-router-mpls-if ethernet-slot/port-dynamic-bypass)

## Usage Guidelines

The maximum number of bypass LSPs supported on a router is limited to 500. The maximum number of dynamic bypass LSP that can be configured on a system is (500 - (current number of configured Bypass LSPs)).

When this parameter is not configured under interface mode, the global **max-bypasses** parameter value is considered for this parameter. This parameter value must be less than the globally set **max-bypasses** value.

The **no** form of the command removes the maximum bypass limit and falls back to the default value of 250.

## Examples

The following example configures the maximum number of bypasses to 300.

```
device>configure
device(config)# router mpls
device9Config-router-mpls)# dynamic bypass
device (config-router-mpls-dynamic-bypass)# max-bypasses 300
```

the following example disables the max-bypasses command for MPLS Ethernet interface 2/8.

```
device>configure
device(config)# router mpls
device(config-router-mpls)# mpls-interface ethernet 2/8
device(config-router-mpls-if-ethernet-2/8)# dynamic bypass
device(config-router-mpls-if-ethernet-2/8-dynamic-bypass)# disable
```

## History

Release version	Command history
17r.1.00	This command was introduced.



## max-bypasses-per-mp

Use the **max-bypasses-per-mp** command in the global mode or interface mode to configure the maximum number of dynamic bypass LSPs that can be created to a merge point.

### Syntax

```
max-bypasses-per-mp { max_bypass_per_mp_count }
no max-bypasses-per-mp { max_bypass_per_mp_count }
```

### Command Default

The system inherits the configured **max-bypasses** command value.

### Parameters

*max\_bypass\_per\_mp\_count*  
Specifies the number of maximum bypasses for each merge point. The range is from 1 to 500.

### Modes

MPLS router dynamic bypass configuration mode (config-router-mpls-dynamic-bypass).

MPLS router MPLS interface dynamic bypass configuration mode (config-router-mpls-if-ethernet-slot/port-dynamic-bypass).

### Usage Guidelines

The global value is taken as the interface mode maximum bypasses per MP default value (when the user has not configured this value in the interface mode).

This is the limit for the total number of dynamic bypass LSPs that can be created to a MP corresponding to a protected interface. A PLR can have 'M' number of MP to a protected LSP. There can be 'N' number of protected LSPs riding on an interface with dynamic bypass enabled. The max-bypasses configuration limits the maximum number of dynamic bypass LSPs that can be sent to each Merge Point.

When the **max-bypasses-per-mp** changes to a value which is less than the current active number of dynamic bypasses, then the limit changes to the new value and this limit is considered for the next new creations. Existing exceeding number dynamic bypasses do not delete.

When the **max-bypasses-per-mp** changes to a value which is more than system max-bypasses limit, then there is a warning message.

The **no** form of the command removes the maximum bypasses per MP limit and falls back to its default value, which is the max-bypasses value at the time of issuing this command.

## Examples

The following example configures the maximum number of bypasses per merge point to 300.

```
device>configure
device(config)# router mpls
device(config-router-mpls)# dynamic-bypass
device(config-router-mpls-dynamic-bypass)# max-bypasses-per-mp 100
```

The following example configures MPLS Ethernet interface 2/8 to a maximum number of bypasses per merge point to 5.

```
device>configure
device(config)# router mpls
device(config-router-mpls)# mpls-interface ethernet 2/8
device(config-router-mpls-if-ethernet-2/8)# dynamic-bypass
device(config-router-mpls-if-ethernet-2/8-dynamic-bypass)# max-bypasses-per-mp 5
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# max-lsp-lifetime

Sets the maximum number of seconds an unrefreshed Link State PDU (LSP) remains in the LSP database of a device.

## Syntax

```
max-lsp-lifetime secs
```

```
max-lsp-lifetime secs
```

## Command Default

The default maximum lifetime is 1200 seconds (20 minutes).

## Parameters

secs

Specifies the maximum lifetime in seconds. Valid values range from 1 through 65535 seconds. The default is 1200 seconds.

## Modes

IS-IS router configuration mode

## Usage Guidelines

The **max-lsp-lifetime** and **lsp-refresh-interval** commands must be configured in such a way that the LSPs are refreshed before the maximum LSP lifetime is reached; otherwise, the device's originated LSPs may be timed out by neighbors of the device.

The **no** form of the command removes the configured period of time.

## Examples

The following example changes the maximum LSP lifetime to 2400 seconds.

```
device# configure terminal
device(config)# router isis
device(config-isis-router)# max-lsp-lifetime 2400
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# max-mcache

Configures the maximum multicast cache size.

## Syntax

```
max-mcache num
no max-mcache
```

## Command Default

Multicast cache size is 24576 entries.

## Parameters

*num*  
Number of entries in the multicast cache. Valid values range from 1 through 24576.

## Modes

Router PIM configuration mode

## Usage Guidelines

Entering the **no** form of the command sets the maximum multicast cache size to the default - 24576 entries.

## Examples

Setting the multicast cache to 500 entries.

```
device(config)# router pim
device(conf-pim-router)# max-mcache 500
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# max-metric router-lsa

Advertises the maximum metric value in different Link State Advertisements (LSAs).

## Syntax

```
max-metric router-lsa [ all-vrfs ] [ all-lsas | external-lsa metric-value | link { all | ptp | stub | transit } | summary-lsa metric-value | on-startup { time | wait-for-bgp [ all-lsas | summary-lsa metric-value | external-lsa metric-value | link { all | ptp | stub | transit } ] }
```

```
no max-metric router-lsa [ all-vrfs ] [ all-lsas | external-lsa | link { all | ptp | stub | transit } | summary-lsa | on-startup { time | wait-for-bgp [ all-lsas | link { all } ] }
```

## Parameters

### all-vrfs

Applies the configuration change to all instances of OSPF.

### all-lsas

Sets the **summary-lsa** and **external-lsa** optional parameters to the corresponding default max-metric value. For a non-default instance of OSPF, only the summary-lsa and external-lsa parameters are set.

### external-lsa *metric-value*

Modifies the metric of all external type 5 LSAs to equal the specified value or a default value. The range for metric value is 1 to 16777214 (0x00001 - 0x00FFFFE), and the default is 16711680 (0x00FF0000).

### link

Specifies the types of links for which the maximum metric is advertised. By default, the maximum metric is advertised only for transit links.

#### all

Advertises the maximum metric in Router LSAs for all supported link types.

#### ptp

Advertises the maximum metric in Router LSAs for point-to-point links.

#### stub

Advertises the maximum metric in Router LSAs for stub links.

#### transit

Advertises the maximum metric in Router LSAs for transit links. This is the default link type.

### summary-lsa *metric-value*

Modifies the metric of all summary type 3 and type 4 LSAs to equal the specified value or a default value. The range for metric value is 1 to 16777215 (0x00001 - 0x00FFFFE), and the default is 16711680 (0x00FF0000).

### on-startup

Applies the configuration change at the next OSPF startup.

#### *time*

Sets the time (in seconds) for which the specified links in Router LSAs are advertised when the metric is set to the maximum value of 0xFFFF. The range for *time* is 5 to 86,400.

**wait-for-bgp**

Indicates that OSPF should wait for either 600 seconds or until BGP has finished route table convergence, whichever happens first, before advertising the links with the normal metric.

## Modes

OSPF router configuration mode

OSPF VRF router configuration mode

## Usage Guidelines

Use this command to set the maximum metric value advertised in different Link State Advertisements (LSAs). When enabled, the router configures the maximum value of the metric for routes and links advertised in various types of LSAs. Because the route metric is set to its maximum value, neighbors will not route traffic through this router except to directly connected networks. Thus, the device becomes a stub router, which is desirable when you want:

- Graceful removal of the router from the network for maintenance.
- Graceful introduction of a new router into the network.
- To avoid forwarding traffic through a router that is in critical condition.

Enter **no max-metric router-lsa all-lsas** to disable advertising the maximum metric value in different LSAs.

## Examples

The following example advertises the maximum metric value using the **all-lsas** option.

```
device# configure terminal
device(config)# router ospf
device(config-router-ospf-vrf-default-vrf)# max-metric router-lsa all-lsas
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# max-metric router-lsa (OSPFv3)

Advertises the maximum metric value in different Link State Advertisements (LSAs).

## Syntax

```
max-metric router-lsa [ all-lsas | external-lsa metric-value | include-stub | on-startup { time | wait-for-bgp } | summary-lsa metric-value ]
```

```
no max-metric router-lsa [ all-lsas | external-lsa | include-stub | on-startup { time | wait-for-bgp } | summary-lsa ]
```

## Parameters

### all-lsas

Sets the **summary-lsa** and **external-lsa** optional parameters to the corresponding default max-metric value. For a non-default instance of OSPFv3, only the summary-lsa and external-lsa parameters are set.

### external-lsa *metric-value*

Configures the maximum metric value for all external type-5 and type-7 LSAs. The range for metric value is 1 to 16777214 (0x00001 - 0x00FFFFFFE), and the default is 16711680 (0x00FF0000).

### include-stub

Specifies the advertisement of the maximum metric value for point-to-point and broadcast stub links in the intra-area-prefix LSA..

### on-startup

Applies the configuration change at the next OSPF startup.

#### *time*

Sets the time (in seconds) for which the specified links in Router LSAs are advertised when the metric is set to the maximum value of 0xFFFF. The range for *time* is 5 to 86400.

### wait-for-bgp

Specifies that OSPFv3 should wait until BGP has finished route table convergence before advertising the links with the normal metric, or for no more than 600 seconds.

### summary-lsa *metric-value*

Configures the maximum metric value for all summary type 3 and type 4 LSAs. The range for metric value is 1 to 16777215 (0x00001 - 0x00FFFFFFE), and the default is 16711680 (0x00FF0000).

## Modes

OSPFv3 router configuration mode

OSPFv3 VRF router configuration mode

## Usage Guidelines

Use this command to set the maximum metric value advertised in different Link State Advertisements (LSAs). When enabled, the router configures the maximum value of the metric for routes and links advertised in various types of LSAs. Because the route metric is set to its maximum value, neighbors will not route traffic through this router except to directly connected networks. Thus, the device becomes a stub router, which is desirable when you want:

- Graceful removal of the router from the network for maintenance.
- Graceful introduction of a new router into the network.
- To avoid forwarding traffic through a router that is in critical condition.

Enter **no max-metric router-lsa** to disable advertising the maximum metric value in different LSAs.

## Examples

The following example configures an OSPFv3 device to advertise a maximum metric and sets the maximum metric value for all external type-5 and type-7 LSAs to 1000.

```
device# configure terminal
device(config)# ipv6 router ospf
device(config-ipv6-router-ospf-vrf-default-vrf)# max-metric router-lsa external-lsa 1000
```

The following example configures an OSPFv3 device to advertise a maximum metric and specifies the advertisement of the maximum metric value for point-to-point and broadcast stub links in the intra-area-prefix LSA.

```
device# configure terminal
device(config)# ipv6 router ospf
device(config-ipv6-router-ospf-vrf-default-vrf)# max-metric router-lsa include-stub
```

The following example configures an OSPFv3 device to advertise a maximum metric until BGP routing tables converge or until the default timer of 600 seconds expires.

```
device# configure terminal
device(config)# ipv6 router ospf
device(config-ipv6-router-ospf-vrf-default-vrf)# max-metric router-lsa on-startup wait-for-bgp
```

The following example configures an OSPFv3 device to advertise a maximum metric and sets the maximum metric value for all summary type-3 and type-4 LSAs to 100.

```
device# configure terminal
device(config)# ipv6 router ospf
device(config-ipv6-router-ospf-vrf-default-vrf)# max-metric router-lsa summary-lsa 100
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# max-neighbor-reconnect-time

Specifies the maximum time that this router must wait for a graceful restart (GR) neighbor to restore the LDP session.

## Syntax

`max-neighbor-reconnect-time` *seconds*

`no max-neighbor-reconnect-time` *seconds*

## Command Default

120 seconds

## Parameters

*seconds*

Specifies the maximum time in seconds that this router must wait for a GR neighbor to restore the LDP session. Enter a integer from 60 to 300. The default setting is 120.

## Modes

MPLS LDP GR configuration mode

## Usage Guidelines

The **no** form of the command resets the default time of 120 seconds.

## Examples

The following example sets the LDP GR timer to 180 seconds.

```
device# configure terminal
device(config)# router mpls
device(config-router-mpls)# ldp
device(config-router-mpls-ldp)# graceful-restart
device(config-router-mpls-ldp-gr)# max-neighbor-reconnect-time 180
```

## History

Release version	Command history
16r. 1.00	This command was introduced.

# max-neighbor-recovery-time

Specifies the maximum amount of time that this router waits for a graceful restart (GR) neighbor to complete its GR recovery after the LDP session has been reestablished.

## Syntax

```
max-neighbor-recovery-time seconds
no max-neighbor-recovery-time seconds
```

## Command Default

The default maximum time is 120 seconds.

## Parameters

*seconds*

Specifies the maximum amount of time in seconds that this router waits for a GR neighbor to complete its GR recovery after the LDP session has been reestablished. Enter an integer from 60 to 3600. The default setting is 120.

## Modes

MPLS LDP GR configuration mode

## Usage Guidelines

Recovery-time must be chosen accordingly taking into account the time it takes for RTM to recompute the routes and the number of Layer 3 FECs that need to be recovered as part of the LDP GR recovery. This is applicable to GR processing on ingress as well as transit LSRs.

The **no** form of the command resets the default time of 120 seconds.

## Examples

The following example sets the LDP GR timer to 240 seconds.

```
device# configure terminal
device(config)# router mpls
device(config-router-mpls)# ldp
device(config-router-mpls-ldp)# graceful-restart
device(config-router-mpls-ldp-gr)# max-neighbor-recovery-time 240
```

## History

Release version	Command history
16r. 1.00	This command was introduced.

# med-missing-as-worst

Configures the device to favor a route that has a Multi-Exit Discriminator (MED) over a route that does not have one.

## Syntax

```
med-missing-as-worst
no med-missing-as-worst
```

## Modes

BGP configuration mode

## Usage Guidelines

When MEDs are compared, by default the device favors a low MED over a higher one. Because the device assigns a value of 0 to a route path MED if the MED value is missing, the default MED comparison results in the device favoring the route paths that do not have MEDs.

The **no** form of the command restores the default where a device does not favor a route that has a MED over other routes.

## Examples

The following example configures the device to favor a route containing a MED.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# med-missing-as-worst
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# measurement-interval

Configures the SLM Measurement interval for Connectivity Fault Management (CFM).

## Syntax

```
measurement-interval { interval }
no measurement-interval
```

## Command Default

The default interval is fifteen minutes.

## Parameters

*interval*

The interval period, in minutes. The range of valid vaules is from 1 through 1440.

## Modes

CFM protocol configuration mode

Y.1731 configuration mode

## Usage Guidelines

The **no measurement-interval** command resets the interval to the default value.

## Examples

Example of setting the interval when configured for VLAN 30.

```
device# configure terminal
device(config-cfm)#domain name md1 level 4
device(config-cfm-md-md1)#ma-name ma1 id 1 vlan-id 30 pri 7
device(config-cfm-md-ma-ma1)# measurement interval 25
```

Example of configuring the interval for Y.1731 configuration mode.

```
device# configure terminal
device(config)# protocol cfm
device(protocol-cfm)# y1731
device(protocol-cfm-y1731)# test-profile my_test_profile
device(protocol-cfm-y1731-my_test_profile)# measurement-interval 20
device(protocol-cfm-y1731-my_test_profile)# exit
```

## History

Release version	Command history
17r.1.01a	This command was introduced.

# member bridge-domain (MCT)

Adds an individual bridge domain or a range of bridge domains as members to the MCT cluster.

## Syntax

```
member bridge-domain { add | remove } member-BD
```

## Parameters

### add

Adds a bridge domain to the MCT cluster.

### remove

Removes configured bridge domain from the MCT cluster.

### member-BD

Specifies the bridge domain members of the MCT cluster. You can include an individual bridge domain and a range of bridge domains. To specify a range, insert a hyphen between the beginning and ending integers (for example, 5-16). To specify individual and ranges of bridge domains, separate them by commas (for example, 1,2,4-7,8,9-22,55-66). You can enter a maximum of 253 characters.

## Modes

Cluster configuration mode

## Usage Guidelines

Configure the member bridge domain before deploying the cluster.

Each cluster can control up to 4096 bridge domains.

## Examples

The following example adds bridge domain 2 and a bridge domain range of 100 through 1,000 to the MCT cluster.

```
device# configure terminal
device(config)# cluster MCT1 1
device(config-cluster-1)# member bridge-domain add 2,100-1000
```

The following example removed bridge domain member from the MCT cluster.

```
device# configure terminal
device(config)# cluster MCT1 1
device(config-cluster-1)# member bridge-domain remove 2
```

## History

Release version	Command history
17r.1.01	This command was introduced.

# member-bridge-domain

Configures member bridge domains for a topology group.

## Syntax

```
member-bridge-domain { add | remove } bridge_domain_id
```

## Command Default

The topology group has no member bridge domains.

## Parameters

### add

Add a bridge domain to the topology group.

### remove

Remove a bridge domain from the topology group.

### bridge\_domain\_id

Bridge domain ID or the bridge domain range; for example: 1, 2, 4-7, 8, 9-22, 55-66. The maximum is 253 characters.

## Modes

Topology group configuration mode.

## Usage Guidelines

You must first add a master VLAN to the topology group.

## Examples

The following example adds the member VLANs to the STP topology group.

```
device# configure terminal
device(config)# topology-group 10
device(config-topo-group-10)# master-vlan 15
device(config-topo-group-10)# member-bridge-domain add 5
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# member vlan

Adds VLANs as members to the MCT cluster.

## Syntax

```
member vlan { add | remove } member-vlan
no member
```

## Parameters

### add

Adds a VLAN or a range of VLANs to the MCT cluster.

### remove

Removes configured member VLANs from the MCT cluster.

### *member-vlan*

Specifies the VLAN members of the MCT cluster. You can include an individual VLAN and a range of VLANs. To specify a range of VLAN, insert a hyphen between the beginning and ending integers (for example, 5-16). To specify individual and ranges of VLANs, separate them by commas (for example, 1,2,4-7,8,9-22,55-66). You can enter a maximum of 253 characters.

## Modes

Cluster configuration mode

## Usage Guidelines

The member VLAN group must be configured before deploying the cluster.

Each cluster can control up to 4096 VLANs. The VLANs within a VLAN group have the same ports and use the same values for other VLAN parameters.

The **no** form of the command removes all member VLANs from the MCT cluster.

## Examples

The following example adds the VLAN members to the MCT cluster.

```
device(config)# cluster MCT1 1
device(config-cluster-1)# member vlan add 2,4-7
```

The following example removed VLAN members from the MCT cluster.

```
device(config)# cluster MCT1 1
device(config-cluster-1)# member vlan remove 4-7
```

## History

Release version	Command history
16r.1.01	This command was introduced.



# member-vlan (STP)

Adds member VLANs to an STP topology group.

## Syntax

```
member-vlan { add | remove } vlan_id
```

## Command Default

The topology group has no member VLANs.

## Parameters

### add

Add a VLAN to the topology group.

### remove

Remove a VLAN from the topology group.

### vlan\_id

Adds a member VLAN ID to the STP topology group. This can be a single VLAN or a range of VLANs. For example: 2, 4-7, 8, 9-22, 55-66. The maximum input is 253 characters.

## Modes

Topology group configuration mode.

## Usage Guidelines

The VLAN(s) must be configured before adding to the topology group.

You must first add a master VLAN to the topology group.

All the VLANs in the member group inherit the STP settings of the master VLAN in the group.

## Examples

The following example adds the member VLANs to the STP topology group.

```
device# configure terminal
device(config)# topology-group 10
device(config-topo-group-10)# master-vlan 15
device(config-topo-group-10)# member-vlan add 5
```

## History

Release version	Command history
16r.1.00	This command was introduced.

## mep

Adds local ports as Maintenance End Points (MEP) to a specific Maintenance Association (MA).

## Syntax

```
mep { mep-id [ up | down ] } [ vlan vlan-id ] [ ethernet slot/ port ] [ port-channel channel ]
no mep mep-id
```

## Command Default

There are no MEP configured.

## Parameters

### ethernet

Specifies a physical Ethernet interface.

### slot

Specifies a valid slot number.

### port

Specifies a valid port number.

### inner-vlan *vlan-id*

Specifies the Inner VLAN.

### port-channel *index*

Specifies a port-channel.

### vlan *vlan-id*

Specifies a VLAN.

## Modes

CFM protocol configuration mode

## Usage Guidelines

The **no mep** command deletes the MEP from the MA.

A Maintenance Domain (MD) is part of a network controlled by a single operator. The MD levels are carried on all CFM frames to identify different domains. Every MD can be further divided into smaller networks having multiple Maintenance End Points (MEP). Usually an MA is associated with a service instances (for example a VLAN or a VPLS).

MEP is located on the edge of an MA. It defines the endpoint of the MA. Each MEP has unique ID (MEPID) within MA. The connectivity in a MA is defined as connectivity between MEPs. The MEP generates Continuity Check Message and multicasts to all the other MEPs in the same MA to verify connectivity.

Each MEP has a direction, down or up. Down MEP receives CFM PDUs from the LAN and sends CFM PDUs towards the LAN. Up MEP receives CFM PDUs from a bridge relay entity and sends CFM PDUs towards the bridge relay entity on a bridge. End stations support down MEPs only, as they have no bridge relay entities.

## Examples

Example defining a MEP for VLAN 30 in the down direction.

```
device# configure terminal
device(config)# protocol cfm
device(config-cfm)# domain name md1 level 4
device(config-cfm-md-md1)# ma-name mal id 1 vlan-id 30 priority 3
device(config-cfm-md-ma-mal)# mep 1 down ethernet 1/2
```

## History

Release version	Command history
16r.1.01	This command was introduced.
17r.1.01a	Modified to allow MEP configuration on port-channel interfaces.

# message-interval

Configures the Protocol Independent Multicast (PIM) Join or Prune message interval.

## Syntax

```
message-interval num
no message-interval num
```

## Command Default

60 seconds

## Parameters

*num*

The interval value in seconds. Valid values range from 10 through 65535 seconds.

## Modes

Router PIM configuration mode

## Usage Guidelines

Use this command to specify the interval at which the periodic PIM Join or Prune messages must be sent out.

Enter the **no** form of the command to disable this feature.

## Examples

Setting the interval to one hour.

```
device(config)# router pim
device(conf-pim-router)# message-interval 3600
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# metric

Assigns a metric to the LSP, which routing protocols can use to determine the relative preference among several LSPs towards a given destination.

## Syntax

**metric** *number*

**no metric** *number*

## Command Default

All LSPs have a metric of 1.

## Parameters

*number*

Specifies the metric value. Enter an integer from 1 to 65535. A lower value is preferred over a higher value.

## Modes

MPLS LSP configuration mode

## Usage Guidelines

When multiple LSPs have the same destination LSR, and they have the same metric, the traffic load is shared among them.

Use the **no** form of the command to reset the default value.

## Examples

The following example configures LSP to22 with a metric value of 20.

```
device(config)# router mpls
device(config-router-mpls)# lsp to22
device(config-router-mpls-lsp-to22)# no enable
device(config-router-mpls-lsp-to22)# to 10.1.1.2
device(config-router-mpls-lsp-to22)# from 10.1.1.1
device(config-router-mpls-lsp-to22)# metric 20
device(config-router-mpls-lsp-to22)# enable
device(config-router-mpls-lsp-to22)#exit
```

## History

Release	Command history
16r. 1.00	This command is introduced.

# metric-style wide

Enables the wide metric type for new style of TLVs with Intermediate System-to-Intermediate System (IS-IS).

## Syntax

```
metric-style wide [ level-1 | level-2 ]
```

```
no metric-style wide
```

## Command Default

The wide metric type is not used.

## Parameters

### level-1

Specifies the IS-IS routing parameter as Level 1.

### level-2

Specifies the IS-IS routing parameter as Level 2.

## Modes

IS-IS address-family IPv4 unicast configuration mode

## Usage Guidelines

When LDP-IGP synchronization is enabled, the wide metric type must be used.

The **no** form of the command disables the use of the wide metric type.

## Examples

The following example enables the wide metric type for Level 1 packets for the IS-IS IPv4 unicast address family.

```
device# configure terminal
device(config)# router isis
device(config-isis-router)# address-family ipv4 unicast
device(config-router-isis-ipv4u)# metric-style wide level-1
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# metric-type

Configures the default metric type for external routes.

## Syntax

```
metric-type { type1 | type2 }
no metric-type { type1 | type2 }
```

## Command Default

Type 1

## Parameters

### type1

The metric of a neighbor is the cost between itself and the device plus the cost of using this device for routing to the rest of the world.

### type2

The metric of a neighbor is the total cost from the redistributing device to the rest of the world.

## Modes

- OSPF router configuration mode
- OSPFv3 router configuration mode
- OSPF router VRF configuration mode
- OSPFv3 router VRF configuration mode

## Usage Guidelines

The **no** form of the command restores the default setting. You must specify a type parameter when using the **no** form.

## Examples

The following example sets the default metric type for external routes to type 2.

```
device# configure terminal
device(config)# router ospf
device(config-router-ospf-vrf-default-vrf)# metric-type type2
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# mip-policy

Specifies the conditions in which Maintenance Intermediate Points (MIP) are automatically created on ports.

## Syntax

```
mip-policy { explicit | default }
no mip-policy
```

## Command Default

The MIP policy is set to **default**.

## Parameters

### explicit

Specifies that explicit MIPs are configured only if a MEP exists on a lower MD Level.

### default

Specifies that MIPs are always configured.

## Modes

CFM protocol configuration mode .

## Usage Guidelines

Use the **no mip-policy** to reset the values to the default.

A Maintenance Intermediate Point (MIP) can be created on a port and VLAN automatically, but only when either the explicit or default policy has been defined for them. For a specific port and VLAN, a MIP is created at the lowest level. Additionally, the level created should be the next higher than the MEP level defined for the port and VLAN.

Use the **explicit** parameter to specify that explicit MIPs are configured only if a MEP exists on a lower Maintenance Domain (MD) level.

Use the **default** parameter to specify that MIPs are always configured.

## Examples

Example of the MIP policy command set for explicit when configured for VLAN 30.

```
device# configure terminal
device(config-cfm)#domain name mdl level 4
device(config-cfm-md-md1)#ma-name mal id 1 vlan-id 30 pri 7
device(config-cfm-md-ma-mal)#mip-policy explicit
```



## History

Release version	Command history
16r.1.01	This command was introduced.

# mode gre ip

Enables generic routing encapsulation (GRE) over a tunnel interface and specifies that the tunneling protocol is IPv4.

## Syntax

**mode gre ip**

**no mode**

## Command Default

GRE is disabled.

## Modes

Interface tunnel configuration mode

## Usage Guidelines

Use the **no mode gre ip** command to disable the GRE IP tunnel encapsulation method for the tunnel interface.

## Examples

This example enables GRE IP encapsulation on a tunnel interface.

```
device# configure terminal
device(config)# interface tunnel 5
device(config-intf-tunnel-5)# mode gre ip
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# mode (LLDP)

Sets the LLDP mode on the device.

## Syntax

```
mode { tx | rx }
```

## Command Default

Both transmit and receive modes are enabled.

## Parameters

- tx**  
Specifies to enable only the transmit mode.
- rx**  
Specifies to enable only the receive mode.

## Modes

Protocol LLDP configuration mode

## Examples

To enable only the transmit mode:

```
device(conf-lldp)# mode tx
```

To enable only the receive mode:

```
device(conf-lldp)# mode rx
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# mode (port-group)

Configures the ports in a port group of an SLX 9850 36x100G line card as 40G and activates all 10 ports.

## Syntax

```
mode { 40g | 100g }
```

## Command Default

The six ports of a 36X100G port group are configured as 100G and the remaining four are inactive.

## Parameters

**40g**

Configures the ports in a port group as 40G and activates all 10 ports.

**100g**

Configures the default setting of six ports in the port group as 100G and the remaining four ports are inactive.

## Modes

Hardware port-group configuration mode

## Usage Guidelines

Before changing the port speed, you must power off the line card.

You can configure more than one port group on a LC before restoring its power.

## Examples

The following example shows the configuration of the ports in a port group as 40G and all 10 ports are activated.

```
device# power-off linecard 3
device# configure terminal
device(config)# hardware
device(config-hardware)# port-group 3/1
device(config-port-group-3/1)# mode 40g
%Warning: port-group mode is a disruptive command.
Please power-cycle the line-card for the changes to take place
device(config-port-group-3/1)# Ctrl-z
device# power-on linecard 3
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# monitor session

Enables a Port Mirroring session for monitoring traffic.

## Syntax

```
monitor session session_number
```

```
no monitor session session_number
```

## Parameters

*session\_number*

Specifies a session identification number. Valid values range from 1 through 512.

## Modes

Global configuration mode

## Usage Guidelines

Enter **no monitor session** to delete the port mirroring session.

## Examples

To enable session 22 for monitoring traffic:

```
device# configure terminal
device(config)# monitor session 22
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# mpls-interface

Configures MPLS on an interface and accesses MPLS interface sub-configuration mode to configure its parameters.

## Syntax

```
mpls-interface { ethernet slot/port | ve number}
no mpls-interface { ethernet slot/port | ve number}
```

## Parameters

**ethernet slot/port**  
Specifies an Ethernet slot and port.

**ve number**  
Specifies the VE interface number.

## Modes

MPLS configuration mode

## Usage Guidelines

Use the **no** form of this command to remove the MPLS interface.

You cannot configure MPLS on a VE interface associated with a protocol based VLAN. The command is rejected, and an error message is displayed.

After you enable MPLS globally on the device, you can enable it on one or more interfaces.

## Examples

The following example configures MPLS on Ethernet interface 1/12.

```
device# configure
device(config)# router mpls
device(config-router-mpls)# mpls-interface ethernet 1/12
device(config-router-mpls-if-1/12)# ldp-params
device(config-router-mpls-if-1/12-ldp-params)# exit
device(config-router-mpls-if-ethernet-1/12)# rsvp
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# mpls reoptimize

Under ordinary conditions, an LSP path does not change unless the path becomes inoperable. Consequently, the router must be directed to consider configuration changes made to an LSP and to optimize the LSP path based on those changes.

## Syntax

```
mpls reoptimize { all | lsp lsp_name }
```

## Parameters

**all**

Reoptimizes all LSPs.

**lsp***lsp\_name*

Reoptimizes the specified LSP.

## Modes

Privileged EXEC mode

## Usage Guidelines

On re-optimization of an adaptive LSP, LSP accounting statistics might miss the accounting of some of the packets.

## Examples

The following example uses the **mpls re-optimize** command to re-optimize LSP *to20*.

```
device# mpls reoptimize lsp to20
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# mtu

Configures the maximum transmission unit (MTU) for a pseudowire (PW) profile.

## Syntax

**mtu** *mtu-value*

**no mtu**

## Command Default

The MTU value is set to 1500.

## Parameters

*mtu-value*

Specifies the maximum transmission unit (MTU) for the PW profile. Values range from 64 through 15966.

## Modes

Pseudowire-profile configuration mode.

## Usage Guidelines

The **no** form of the command restores the default configuration.

## Examples

The following example shows how to set the MTU value to 2000 for a PW profile named test.

```
device# configure terminal
device(config)# pw-profile test
device(config-pw-profile-test)# mtu 2000
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# mtu-enforce

Configures MTU enforcement check for a pseudowire (PW) profile.

## Syntax

```
mtu-enforce { false | true }
no mtu-enforce
```

## Command Default

MTU enforcement is disabled.

## Parameters

*false*  
Disables the MTU enforcement check.

*true*  
Enables the MTU enforcement check.

## Modes

Pseudowire-profile configuration mode.

## Usage Guidelines

MTU enforcement is only supported during PW signaling.

The **no** form of the command restores the default value.

## Examples

The following example shows how to enable MTU enforcement check for a PW profile named test.

```
device# configure terminal
device(config)# pw-profile test
device(config-pw-profile-test)# mtu-enforce true
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# multipath

Changes load sharing to apply to only iBGP or eBGP paths, or to support load sharing among paths from different neighboring autonomous systems.

## Syntax

```
multipath { ebgp | ibgp | multi-as }
```

```
no multipath { ebgp | ibgp | multi-as }
```

## Command Default

This option is disabled.

## Parameters

### ebgp

Enables load sharing of eBGP paths only.

### ibgp

Enables load sharing of iBGP paths only.

### multi-as

Enables load sharing of paths from different neighboring autonomous systems.

## Modes

BGP address-family IPv4 unicast configuration mode

BGP address-family IPv6 unicast configuration mode

BGP address-family IPv4 unicast VRF configuration mode

BGP address-family IPv6 unicast VRF configuration mode

## Usage Guidelines

Use the **no** form of this command to restore the default.

By default, when BGP load sharing is enabled, both iBGP and eBGP paths are eligible for load sharing, while paths from different neighboring autonomous systems are not.

## Examples

This example changes load sharing to apply to iBGP paths in the IPv4 address family.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv4 unicast
device(config-bgp-ipv4u)# multipath ibgp
```

This example enables load sharing of paths from different neighboring autonomous systems in the IPv6 address family.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv6 unicast
device(config-bgp-ipv6u)# multipath multi-as
```

This example changes load sharing to apply to eBGP paths in IPv4 VRF instance "red":

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv4 unicast vrf red
device(config-bgp-ipv4u-vrf)# multipath ebgp
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# multiplier (LLDP)

Sets the number of consecutive misses of hello messages before LLDP declares the neighbor as dead.

## Syntax

`multiplier value`

`no multiplier`

## Command Default

Multiplier default value is 4.

## Parameters

*value*

Specifies a multiplier value to use. Valid values range from 2 through 10.

## Modes

Protocol LLDP and profile configuration modes

## Usage Guidelines

Enter `no multiplier` to return to the default setting.

The LLDP multiplier can also be configured for a specific LLDP profile. When you apply an LLDP profile on an interface using the `lldp profile` command, it overrides the global configuration. If a profile is not present, then the default global profile is used until you create a valid profile.

## Examples

To set the number of consecutive misses:

```
device(config-lldp)# multiplier 2
```

To set the number of consecutive misses for a specific LLDP profile:

```
device(config-lldp)# profile test1
device(config-profile-test1)# multiplier 5
device(config-profile-test1)#
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# multiplier (UDLD)

Sets timeout multiplier for missed UDLD PDUs.

## Syntax

`multiplier value`

`no multiplier`

## Command Default

Multiplier default value is 5.

## Parameters

*value*

Specifies a multiplier value to use. Valid values range from 3 through 10.

## Modes

Protocol UDLD configuration mode

## Usage Guidelines

When the device at one end is an Extreme Networks IP product, the timeout interval is the product of the "hello" time interval at the other end and the "multiplier" value.

When the UDLD protocol times out waiting for UDLD PDUs, it will block the port.

Enter **no multiplier** to return to the default setting.

## Examples

To set the multiplier to 8:

```
device# configure terminal
device(config)# protocol udld
device(config-udld)# multiplier 8
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# multi-topology

Enables IPv6 Intermediate System-to-Intermediate System (IS-IS) MT in an area or a domain so that the MT-enabled device runs IPv6 IS-IS in multi SPF mode.

## Syntax

```
multi-topology [ transition ]
no multi-topology [ transition ]
```

## Command Default

The transition option is disabled.

## Parameters

### transition

Enables IPv6 IS-IS MT transition mode in an area or a domain so that a network operating in IPv6 IS-IS single-topology support mode can continue to work while upgrading devices to include IPv6 IS-IS MT support.

## Modes

IS-IS address-family IPv6 unicast configuration mode

## Usage Guidelines

When transition mode is not enabled, the routers operating in single-topology mode do not establish IPv6 connectivity with the routers operating in MT mode.

The **no** form of the command disables IPv6 IS-IS MT.

## Examples

The following example enables IPv6 IS-IS MT.

```
device# configure terminal
device(config)# router isis
device(config-isis-router)# address-family ipv6 unicast
device(config-router-isis-ipv6u)# multi-topology
```

The following example enables IPv6 IS-IS MT with transition support.

```
device# configure terminal
device(config)# router isis
device(config-isis-router)# address-family ipv6 unicast
device(config-router-isis-ipv6u)# multi-topology transition
```

## History

Release version	Command history
16r.1.00	This command was introduced.





# Commands N - Q

---

## name-prefix

Use the **name-prefix** interface command to specify a name prefix for the dynamic bypass LSPs to be created for the MPLS protected interface.

## Syntax

```
name-prefix { name }  
no name-prefix { name }
```

## Command Default

The default name prefix is *dbyp*.

## Parameters

*name*

Specifies the selected character string. The length of the character string is between 1 and 21 characters.

## Modes

MPLS router MPLS interface dynamic bypass configuration mode (config-router-mpls-if-ethernet-slot/port -dynamic-bypass).

## Usage Guidelines

The **no** form of the command removes the name prefix and sets its value to the default string *dbyp*.

When configuring, the dynamic bypass LSPs names must start with this name prefix, appended by interface IP, Merge Point IP (for node protection), and a unique number.

The name prefix configuration is only allowed when there no existing dynamic bypasses corresponding to a dynamic bypass interface. When the user wants to change the name prefix, the user must disable the dynamic bypass on the interface and reconfigure the name prefix, then re-enable the dynamic bypass on the interface.

## Examples

The following example configures the name prefix for MPLS Ethernet interface *2/8* to *MyDbypass*.

```
device>configure  
device(config)# router mpls  
device(config-router-mpls)# mpls-interface ethernet 2/8  
device(config-router-mpls-if-ethernet-2/8)# dynamic-bypass  
device(config-router-mpls-if-ethernet-2/8-dynamic-bypass)# name-prefix MyDbypass
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# nbr-timeout

Configures the neighbor timeout interval after which a neighbor is considered to be absent.

## Syntax

```
nbr-timeout num
no nbr-timeout
```

## Command Default

The default is 105 seconds.

## Parameters

*num*

Interval value in seconds. Valid values range from 35 through 12600 seconds.

## Modes

Router PIM configuration mode

## Usage Guidelines

Neighbor timeout is the interval after which a PIM device will consider a neighbor to be absent. Absence of PIM hello messages from a neighboring device indicates that a neighbor is not present. The interval can be set between 3 and 65535 seconds, and it should not be less than 3.5 times the hello timer value.

Enter **no nbr-timeout** to disable this feature.

## Examples

Setting the timeout to 600 seconds.

```
device(config)# router pim
device(config-pim-router)# nbr-timeout 600
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# neighbor activate

Enables the exchange of information with BGP neighbors and peer groups.

## Syntax

**neighbor** { *ip-address* | *ipv6-address* | *peer-group-name* } **activate**

**no neighbor** { *ip-address* | *ipv6-address* | *peer-group-name* } **activate**

## Command Default

Enabling address exchange for the IPv4 address family is enabled. Enabling address exchange for the IPv6 address family is disabled.

## Parameters

*ip-address*

Specifies the IPv4 address of the neighbor.

*ipv6-address*

Specifies the IPv6 address of the neighbor.

*peer-group-name*

Specifies a peer group.

## Modes

BGP address-family IPv4 unicast configuration mode

BGP address-family IPv6 unicast configuration mode

BGP address-family IPv4 unicast VRF configuration mode

BGP address-family IPv6 unicast VRF configuration mode

BGP address-family L2VPN EVPN configuration mode

## Usage Guidelines

The **no** form of the command disables the exchange of an address with a BGP neighbor or peer group.

## Examples

The following example establishes a BGP session with a neighbor with the IPv6 address 2001:2018:8192::125.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv6 unicast
device(config-bgp-ipv6u)# neighbor 2001:2018:8192::125 activate
```

The following example establishes a BGP session with a neighbor with the IP address 10.1.1.1 in L2VPN EVPN configuration mode.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family l2vpn evpn
device(config-bgp-evpn)# neighbor 10.1.1.1 activate
```

## History

Release version	Command history
16r.1.00	This command was introduced.
17r.1.01	Support was added for the BGP address-family L2VPN EVPN configuration mode.

# neighbor advertisement-interval

Enables changes to the interval over which a specified neighbor or peer group holds route updates before forwarding them.

## Syntax

```
neighbor { ip-address | ipv6-address | peer-group-name } advertisement-interval seconds
no neighbor { ip-address | ipv6-address | peer-group-name } advertisement-interval
```

## Parameters

*ip-address*

IPv4 address of the neighbor.

*ipv6-address*

IPv6 address of the neighbor.

*peer-group-name*

Peer group name configured by the **neighbor peer-group-name** command.

*seconds*

Range is from 0 through 3600. The default is 0.

## Modes

BGP configuration mode

BGP address-family IPv4 unicast VRF configuration mode

BGP address-family IPv6 unicast VRF configuration mode

## Usage Guidelines

The **no** form of the command restores the default interval.

## Examples

The following example changes the BGP4 advertisement interval from the default to 60 seconds.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# neighbor 10.11.12.13 advertisement-interval 60
```

The following example changes the BGP4+ advertisement interval from the default for VRF instance "red".

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv6 unicast vrf red
device(config-bgp-ipv6u-vrf)# neighbor 2001:2018:8192::125 advertisement-interval 60
```

## History

Release version	Command history
16r.1.00	This command was introduced.

## neighbor allowas-in

Disables the AS\_PATH check function for routes learned from a specified neighbor so that BGP does not reject routes that contain the recipient BGP speaker's AS number.

### Syntax

```
neighbor {ip-address | ipv6-address | peer-group-name } allowas-in number
no neighbor allowas-in {ip-address | ipv6-address | peer-group-name } allowas-in
```

### Command Default

The AS\_PATH check function is enabled and any route whose path contains the speaker's AS number is rejected as a loop.

### Parameters

*ip-address*

Specifies the IP address of the neighbor.

*ipv6-address*

Specifies the IPv6 address of the neighbor.

*peer-group-name*

Specifies a peer group.

*number*

Specifies the number of times that the AS path of a received route may contain the recipient BGP speaker's AS number and still be accepted. Valid values are 1 through 10.

### Modes

BGP address-family IPv4 unicast configuration mode

BGP address-family IPv6 unicast configuration mode

BGP address-family IPv4 unicast VRF configuration mode

BGP address-family IPv6 unicast VRF configuration mode

BGP address-family L2VPN EVPN configuration mode

### Usage Guidelines

If the AS\_PATH check function is disabled after a BGP session has been established, the neighbor session must be cleared for this change to take effect.

The **no** form of the command re-enables the AS\_PATH check function.



## Examples

The following example specifies that the AS path of a received route may contain the recipient BGP4+ speaker's AS number three times and still be accepted.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv6 unicast
device(config-bgp-ipv6u)# neighbor 2001:2018:8192::125 allowas-in 3
%Warning: Please clear the neighbor session for the parameter change to take effect!
```

The following example specifies for VRF instance "red" that the BGP4+ AS path of a received route may contain the recipient BGP speaker's AS number three times and still be accepted.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv6 unicast vrf red
device(config-bgp-ipv6u-vrf)# neighbor 2001:2018:8192::124 allowas-in 3
%Warning: Please clear the neighbor session for the parameter change to take effect!
```

The following example specifies that the AS path of a received route may contain the recipient BGP speaker's AS number three times and still be accepted in L2VPN EVPN configuration mode.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family l2vpn evpn
device(config-bgp-evpn)# neighbor 10.1.1.1 allowas-in 3
%Warning: Please clear the neighbor session for the parameter change to take effect!
```

## History

Release version	Command history
16r.1.00	This command was introduced.
17r.1.01	Support was added for the BGP address-family L2VPN EVPN configuration mode.

# neighbor as-override

Replaces the autonomous system number (ASN) of the originating device with the ASN of the sending BGP device.

## Syntax

```
neighbor { ip-address | ipv6-address | peer-group-name } as-override
no neighbor { ip-address | ipv6-address | peer-group-name } as-override
```

## Command Default

This feature is disabled.

## Parameters

*ip-address*

IPv4 address of the neighbor.

*ipv6-address*

IPv6 address of the neighbor.

*peer-group-name*

Peer group name configured by the **neighbor peer-group-name** command.

## Modes

BGP configuration mode

BGP address-family IPv4 unicast VRF configuration mode

BGP address-family IPv6 unicast VRF configuration mode

## Usage Guidelines

Use the **no** form of this command to disable this feature.

BGP loop prevention verifies the ASN in the AS path. If the receiving router sees its own ASN in the AS path of the received BGP packet, the packet is dropped. The receiving router assumes that the packet originated from its own AS and has reached the place of origination. This can be a significant problem if the same ASN is used among various sites, preventing sites with identical ASNs from being linked by another ASN. In this case, routing updates are dropped when another site receives them.

## Examples

This example replaces the ASN globally.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# neighbor 10.11.12.13 as-override
```

This example replaces the BGP4+ ASN for VRF instance "red".

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv6 unicast vrf red
device(config-bgp-ipv6u-vrf)# neighbor 2001:2018:8192::125 as-override
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# neighbor bfd

Enables Bidirectional Forwarding Detection (BFD) sessions for specified Border Gateway Protocol (BGP) neighbors or peer groups.

## Syntax

```
neighbor { ip-address | ipv6-address | peer-group-name } bfd [ holdover-interval time | interval transmit-time min-rx receive-time multiplier number ]
```

```
no neighbor { ip-address | ipv6-address | peer-group-name } bfd [ holdover-interval time | interval transmit-time min-rx receive-time multiplier number ]
```

## Command Default

BFD sessions are not enabled on specific BGP neighbors or peer groups.

## Parameters

*ip-address*

Specifies the IP address of the neighbor.

*ipv6-address*

Specifies the IPv6 address of the neighbor.

*peer-group-name*

Specifies a peer group.

**holdover-interval** *time*

Specifies the holdover interval, in seconds, for which BFD session down notifications are delayed before notification that a BFD session is down. Valid values range from 1 through 30.

**interval** *transmit-time*

Specifies the interval, in milliseconds, a device waits to send a control packet to BFD peers. Valid values range from 50 through 30000.

**min-rx** *receive-time*

Specifies the interval, in milliseconds, a device waits to receive a control packet from BFD peers. Valid values range from 50 through 30000.

**multiplier** *number*

Specifies the number of consecutive BFD control packets that must be missed from a BFD peer before BFD determines that the connection to that peer is not operational. Valid values range from 3 through 50.

## Modes

BGP configuration mode

BGP address-family IPv4 unicast VRF configuration mode

BGP address-family IPv6 unicast VRF configuration mode

## Usage Guidelines

Before using the **holdover-interval**, **interval**, **min-rx**, and **multiplier** parameters, you must first enable BFD using the **neighbor** *{ip-address | ipv6-address | peer-group-name}* **bfd** command.

For single-hop BFD sessions, BFD considers the interval values that are configured on the interface, but not the nondefault values that are configured with this global command.

The **no** form of the command removes the BFD for BGP configuration for BGP neighbors or peer groups.

## Examples

The following example configures BFD for a specified peer group and sets the BFD holdover interval to 18.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# neighbor pg1 bfd
device(config-bgp-router)# neighbor pg1 bfd holdover-interval 18
```

The following example configures BFD for a BGP neighbor with the IP address 10.10.1.1 and sets the BFD session timer values.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# neighbor 10.10.1.1 bfd
device(config-bgp-router)# neighbor 10.10.1.1 bfd interval 120 min-rx 150 multiplier 8
```

## History

Release version	Command history
17r.1.01	This command was introduced.

# neighbor capability as4

Enables or disables support for 4-byte autonomous system numbers (ASNs) at the neighbor or peer-group level.

## Syntax

```
neighbor { ip-address | ipv6-address | peer-group-name } capability as4 [ disable | enable ]
```

```
no neighbor { ip-address | ipv6-address | peer-group-name } capability as4 [ disable | enable ]
```

## Command Default

4-byte ASNs are disabled by default.

## Parameters

*ip-address*

IPv4 address of the neighbor.

*ipv6-address*

IPv6 address of the neighbor .

*peer-group-name*

Peer group name configured by the **neighbor peer-group-name** command.

**disable**

Disables 4-byte numbering.

**enable**

Enables 4-byte numbering.

## Modes

BGP configuration mode

BGP address-family IPv4 unicast VRF configuration mode

BGP address-family IPv6 unicast VRF configuration mode

## Usage Guidelines

Use the **disable** keyword or the **no** form of this command to remove all neighbor capability for 4-byte ASNs.

4-byte ASNs are first considered at the neighbor, then at the peer group, and finally at the global level.

## Examples

This example enables 4-byte ASNs for a specified neighbor.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# neighbor 10.11.12.13 capability as4 enable
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# neighbor capability orf prefixlist

Advertises outbound route filter (ORF) capabilities to peer routers.

## Syntax

```
neighbor { ip_address | ipv6_address | peer-group-name } capability orf prefixlist [ receive | send ]
no neighbor { ip_address | ipv6_address | peer-group-name } capability orf prefixlist [ receive | send ]
```

## Command Default

ORF capabilities are not advertised to a peer device.

## Parameters

*ip\_address*

Specifies the IPv4 address of the neighbor.

*ipv6\_address*

Specifies the IPv6 address of the neighbor.

*peer-group-name*

Specifies a peer group.

**receive**

Enables the ORF prefix list capability in receive mode.

**send**

Enables the ORF prefix list capability in send mode.

## Modes

BGP address-family IPv4 unicast configuration mode

BGP address-family IPv6 unicast configuration mode

BGP address-family IPv4 unicast VRF configuration mode

BGP address-family IPv6 unicast VRF configuration mode

## Usage Guidelines

Use the **no** form of this command to disable ORF capabilities.

## Examples

This example advertises the ORF send capability to a neighbor with the IP address 10.11.12.13.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv4 unicast
device(config-bgp-ipv4u)# neighbor 10.11.12.13 capability orf prefixlist send
```



This example advertises the ORF receive capability to a neighbor with the IPv6 address 2001:2018:8192::125 for VRF instance "red".

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv6 unicast vrf red
device(config-bgp-ipv6u-vrf)# neighbor 2001:2018:8192::125 capability orf prefixlist receive
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# neighbor default-originate

Configures the device to send the default route 0.0.0.0 to a neighbor.

## Syntax

```
neighbor { ip-address | ipv6-address | peer-group-name } default-originate  
no neighbor { ip-address | ipv6-address | peer-group-name } default-originate
```

## Command Default

Disabled.

## Parameters

*ip-address*

IPv4 address of the neighbor.

*ipv6-address*

IPv6 address of the neighbor.

*peer-group-name*

Peer group name configured by the **neighbor peer-group-name** command.

## Modes

BGP address-family IPv4 unicast configuration mode

BGP address-family IPv6 unicast configuration mode

BGP address-family IPv4 unicast VRF configuration mode

BGP address-family IPv6 unicast VRF configuration mode

## Usage Guidelines

The **no** form of the command restores the defaults.

## Examples

The following example sends the default route to the BGP4 neighbor 10.11.12.13.

```
device# configure terminal  
device(config)# router bgp  
device(config-bgp-router)# address-family ipv4 unicast  
device(config-bgp-ipv4u)# neighbor 10.11.12.13 default-originate
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# neighbor description

Specifies a name for a neighbor.

## Syntax

**neighbor** { *ip-address* | *ipv6-address* | *peer-group-name* } **description** *string*

**no neighbor** { *ip-address* | *ipv6-address* | *peer-group-name* } **description**

## Parameters

*ip-address*

IPv4 address of the neighbor.

*ipv6-address*

IPv6 address of the neighbor.

*peer-group-name*

Peer group name configured by the **neighbor** *peer-group-name* command.

**description** *string*

Specifies the name of the neighbor, an alphanumeric string up to 220 characters long.

## Modes

BGP configuration mode

BGP address-family IPv4 unicast VRF configuration mode

BGP address-family IPv6 unicast VRF configuration mode

## Usage Guidelines

The **no** form of the command removes the name.

## Examples

The following example specifies a BGP4 neighbor name.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# neighbor 10.11.12.13 description mygoodneighbor
```

The following example specifies a BGP4+ neighbor name for VRF instance "red".

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv6 unicast vrf red
device(config-bgp-ipv6u-vrf)# neighbor 2001:2018:8192::125 default-originate route-map myroutemap
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# neighbor ebgp-btsh

Enables BGP time to live (TTL) security hack protection (BTSH) for eBGP.

## Syntax

```
neighbor { ip-address | ipv6-address | peer-group-name } ebgp-btsh  
no neighbor { ip-address | ipv6-address | peer-group-name } ebgp-btsh
```

## Command Default

Disabled.

## Parameters

*ip-address*  
Specifies the IPv4 address of the neighbor.

*ipv6-address*  
Specifies the IPv6 address of the neighbor.

*peer-group-name*  
Specifies a peer group.

## Modes

BGP configuration mode  
BGP address-family IPv4 unicast VRF configuration mode  
BGP address-family IPv6 unicast VRF configuration mode

## Usage Guidelines

To maximize the effectiveness of this feature, the **neighbor ebgp-btsh** command should be executed on each participating device. The **neighbor ebgp-btsh** command is supported for both directly connected peering sessions and multihop eBGP peering sessions. For directly connected neighbors, when the **neighbor ebgp-btsh** command is used, the device expects BGP control packets received from the neighbor to have a TTL value of either 254 or 255. For multihop peers, when the **neighbor ebgp-btsh** command is used, the device expects the TTL for BGP control packets received from the neighbor to be greater than or equal to 255 minus the configured number of hops to the neighbor.

The **no** form of the command disables BTSH for eBGP.

## Examples

The following example enables GTSM between a device and a neighbor with the IP address 10.10.10.1.

```
device# configure terminal  
device(config)# router bgp  
device(config-bgp-router)# neighbor 10.1.1.1 ebgp-btsh
```

The following example enables GTSM between a device and a neighbor with the IPv6 address 2001:2018:8192::125.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# neighbor 2001:2018:8192::125 ebgp-btsh
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# neighbor ebgp-multihop

Allows eBGP neighbors that are not on directly connected networks and sets an optional maximum hop count.

## Syntax

```
neighbor { ip-address | ipv6-address | peer-group-name } ebgp-multihop [ max-hop-count ]
no neighbor { ip-address | ipv6-address | peer-group-name } ebgp-multihop
```

## Parameters

*ip-address*

IPv4 address of the neighbor

*ipv6-address*

IPv6 address of the neighbor

*peer-group-name*

Peer group name configured by the **neighbor peer-group-name** command.

*max-hop-count*

Maximum hop count. Range is from 1 through 255.

## Modes

BGP configuration mode

BGP address-family IPv4 unicast VRF configuration mode

BGP address-family IPv6 unicast VRF configuration mode

## Examples

The following example enables eBGP multihop and sets the maximum hop count to 20.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# neighbor 10.11.12.13 ebgp-multihop 20
```

The following example enables BGP4+ eBGP multihop for VRF instance "red" and sets the maximum hop count to 40.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv6 unicast vrf red
device(config-bgp-ipv6u-vrf)# neighbor 2001:2018:8192::125 ebgp-multihop 40
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# neighbor enable-peer-as-check

Enables the outbound AS\_PATH check function so that a BGP sender speaker does not send routes with an AS path that contains the ASN of the receiving speaker.

## Syntax

```
neighbor { ip-address | ipv6-address | peer-group-name } enable-peer-as-check
no neighbor { ip-address | ipv6-address | peer-group-name } enable-peer-as-check
```

## Command Default

Disabled.

## Parameters

*ip-address*  
Specifies the IPv4 address of the neighbor.

*ipv6-address*  
Specifies the IPv6 address of the neighbor.

*peer-group-name*  
Specifies a peer group.

## Modes

BGP address-family L2VPN EVPN configuration mode

## Usage Guidelines

When the **neighbor enable-peer-as-check** command is used for a BGP address family, a neighbor reset is required.

The **no** form of the command disables the AS-path check function.

## Examples

The following example enables the outbound AS\_PATH check function for the L2VPN EVPN unicast address family.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family l2vpn evpn
device(config-bgp-evpn)# neighbor 10.1.1.1 enable-peer-as-check
```

## History

Release version	Command history
17r.1.01	This command was introduced.

# neighbor encapsulation

Sets the encapsulation type for an IPv4 neighbor, IPv6 neighbor, or a peer group.

## Syntax

```
neighbor { IPv4-address | IPv6-address | peer-group-name } { mpls | nsh | vxlan }
no neighbor { IPv4-address | IPv6-address | peer-group-name } { mpls | nsh | vxlan }
```

## Command Default

MPLS encapsulation type.

## Parameters

*IPv4-address*  
Specifies an IPv4 address.

*IPv6-address*  
Specifies an IPv6 address.

*peer-group-name*  
Specifies a peer group.

mpls  
Specifies MPLS encapsulation.

nsh  
Specifies NSH encapsulation.

vxlan  
Specifies VXLAN encapsulation.

## Modes

BGP address-family L2VPN EVPN configuration mode

## Usage Guidelines

The **no** form of the command restores the default.

## Examples

The following example specifies the VXLAN encapsulation for an IPv4 neighbor.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family l2vpn evpn
device(config-bgp-evpn)# neighbor 10.1.1.1 encapsulation vxlan
```

## History

Release version	Command history
17r.1.01	This command was introduced.

# neighbor enforce-first-as

Ensures that a device requires the first ASN listed in the AS\_SEQUENCE field of an AS path-update message from EBGP neighbors to be the ASN of the neighbor that sent the update.

## Syntax

**neighbor** { *ip-address* | *ipv6-address* | *peer-group-name* } **enforce-first-as** [ **disable** | **enable** ]

**no neighbor** { *ip-address* | *ipv6-address* | *peer-group-name* } **enforce-first-as** [ **disable** | **enable** ]

## Command Default

Disabled by default.

## Parameters

*ip-address*

IPv4 address of the neighbor.

*ipv6-address*

IPv6 address of the neighbor.

*peer-group-name*

Peer group name configured by the **neighbor** *peer-group-name* command.

**disable**

Disables this feature.

**enable**

Enables this feature.

## Modes

BGP configuration mode

BGP address-family IPv4 unicast VRF configuration mode

BGP address-family IPv6 unicast VRF configuration mode

## Usage Guidelines

Use the **no** form of this command to disable this requirement globally for the device.

## Examples

This example enables the enforce-first-as feature for a specified neighbor.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# neighbor 10.11.12.13 enforce-first-as enable
```

This example enables the enforce-first-as feature for a BGP4+ specified neighbor for VRF instance "red".

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv6 unicast
device(config-bgp-ipv6u-vrf)# neighbor 2001:2018:8192::125 enforce-first-as enable
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# neighbor filter-list

Specifies a filter list to be applied to updates from or to the specified neighbor.

## Syntax

**neighbor** { *ip-address* | *ipv6-address* | *peer-group-name* } **filter-list** *ip-prefix-list-name* { **in** | **out** }

**no neighbor** { *ip-address* | *ipv6-address* | *peer-group-name* } **filter-list** *ip-prefix-list-name* { **in** | **out** }

## Command Default

No filter list is applied.

## Parameters

*ip-address*

IPv4 address of the neighbor.

*ipv6-address*

IPv6 address of the neighbor.

*peer-group-name*

Peer group name configured by the **neighbor** *peer-group-name* command.

*ip-prefix-list-name*

Name of the filter list. The name must be between 1 and 63 ASCII characters in length.

**in**

Specifies that the list is applied on updates received from the neighbor.

**out**

Specifies that the list is applied on updates sent to the neighbor.

## Modes

BGP address-family IPv4 unicast configuration mode

BGP address-family IPv6 unicast configuration mode

BGP address-family IPv4 unicast VRF configuration mode

BGP address-family IPv6 unicast VRF configuration mode

## Usage Guidelines

Use the **no** form of the command to restore the defaults.

## Examples

This example specifies that filter list "myfilterlist" be applied to updates to a neighbor with the IP address 10.11.12.13 for the default VRF.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv4 unicast
device(config-bgp-ipv4u)# neighbor 10.11.12.13 filter-list myfilterlist out
```

This example specifies that filter list "2" be applied to updates from a neighbor with the IPv6 address 2001:2018:8192::125 for the default VRF.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv6 unicast
device(config-bgp-ipv6u)# neighbor 2001:2018:8192::125 filter-list 2 in
```

This example specifies that filter list "2" be applied to updates from a neighbor with the IPv6 address 2001:2018:8192::125 for VRF instance "red".

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv6 unicast vrf red
device(config-bgp-ipv6u-vrf)# neighbor 2001:2018:8192::125 filter-list 2 in
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# neighbor local-as

Causes the device to prepend the local autonomous system number (ASN) automatically to routes received from an eBGP peer.

## Syntax

```
neighbor { ip-address | ipv6-address | peer-group-name } local-as num [ no-prepend ]
no neighbor { ip-address | ipv6-address | peer-group-name } local-as num [ no-prepend ]
```

## Command Default

This feature is disabled.

## Parameters

*ip-address*

IPv4 address of the neighbor.

*ipv6-address*

IPv6 address of the neighbor.

*peer-group-name*

Peer group name configured by the **neighbor peer-group-name** command.

*num*

Local ASN. Range is from 1 through 4294967295.

**no-prepend**

Causes the device to stop prepending the selected ASN.

## Modes

BGP configuration mode

BGP address-family IPv4 unicast VRF configuration mode

BGP address-family IPv6 unicast VRF configuration mode

## Usage Guidelines

Use the **no** form of this command to remove the local ASN.

## Examples

This example ensures that a device prepends the local ASN.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# neighbor 10.11.12.13 local-as 100
```



This example stops the device from prepending the selected ASN.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# neighbor 10.11.12.13 local-as 100 no-prepend
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# neighbor maxas-limit in

Causes the device to discard routes received in UPDATE messages if those routes exceed a maximum AS path length.

## Syntax

```
neighbor { ip-address | ipv6-address | peer-group-name } maxas-limit in { num | disable }
no neighbor { ip-address | ipv6-address | peer-group-name } maxas-limit in
```

## Command Default

This command is disabled by default.

## Parameters

*ip-address*

IPv4 address of the neighbor.

*ipv6-address*

IPv6 address of the neighbor.

*peer-group-name*

Peer group name configured by the **neighbor peer-group-name** command.

*num*

Maximum length of the AS path. Range is from 0 through 300. The default is 300.

**disable**

Prevents a neighbor from inheriting the configuration from the peer group or global configuration and instead uses the default system value.

## Modes

BGP configuration mode

BGP address-family IPv4 unicast VRF configuration mode

BGP address-family IPv6 unicast VRF configuration mode

## Usage Guidelines

Use the **no** form of this command to remove this configuration.

## Examples

This example changes the length of the maximum allowed AS path length from the default.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# neighbor 10.11.12.13 maxas-limit in 200
```

This example prevents a neighbor from inheriting the configuration from the peer group or global configuration and instead use the default system value.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# neighbor 2001:2018:8192::125 maxas-limit in disable
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# neighbor maximum-prefix

Specifies the maximum number of IP network prefixes (routes) that can be learned from a specified neighbor or peer group.

## Syntax

**neighbor** { *ip-address* | *ipv6-address* | *peer-group-name* } **maximum-prefix** *num* [ *threshold* ] [ **teardown** ]

**no neighbor** { *ip-address* | *ipv6-address* | *peer-group-name* } **maximum-prefix** *num* [ *threshold* ] [ **teardown** ]

## Command Default

This feature is disabled.

## Parameters

*ip-address*

IPv4 address of the neighbor.

*ipv6-address*

IPv6 address of the neighbor.

*peer-group-name*

Peer group name configured by the **neighbor peer-group-name** command.

*num*

Maximum number of IP prefixes that can be learned. Range is from 0 through 2147483647. Default is 0 (unlimited).

*threshold*

Specifies the percentage of the value specified by *num* that causes a syslog message to be generated. Range is from 1 through 100.

**teardown**

Tears down the neighbor session if the maximum number of IP prefixes is exceeded.

## Modes

BGP address-family IPv4 unicast configuration mode

BGP address-family IPv6 unicast configuration mode

BGP address-family IPv4 unicast VRF configuration mode

BGP address-family IPv6 unicast VRF configuration mode

BGP address-family L2VPN EVPN configuration mode

## Usage Guidelines

The **no** form of the command restores the defaults.

## Examples

The following example sets the maximum number of prefixes that will be accepted from the neighbor with the IP address 10.11.12.13 to 100000, and sets the threshold value to 80%.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv4 unicast
device(config-bgp-ipv4u)# neighbor 10.11.12.13 maximum-prefix 100000 threshold 80
```

The following example, for VRF instance "red," sets the maximum number of prefixes that will be accepted from the neighbor with the IPv6 address 2001:2018:8192::125 to 100000, and sets the threshold value to 90%.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv6 unicast vrf red
device(config-bgp-ipv6u-vrf)# neighbor 2001:2018:8192::125 maximum-prefix 100000 threshold 90
```

The following example sets the maximum number of prefixes that will be accepted from the neighbor with the IP address 10.1.2.3 to 100000 in L2VPN EVPN configuration mode.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family l2vpn evpn
device(config-bgp-evpn)# neighbor 10.1.2.3 maximum-prefix 100000
```

## History

Release version	Command history
16r.1.00	This command was introduced.
17r.1.01	Support was added for the BGP address-family L2VPN EVPN configuration mode.

# neighbor next-hop-self

Causes the device to list itself as the next hop in updates that are sent to the specified neighbor.

## Syntax

```
neighbor { ip-address | ipv6-address | peer-group-name } next-hop-self [ always ]
```

```
no neighbor { ip-address | ipv6-address | peer-group-name } next-hop-self [ always ]
```

## Parameters

*ip-address*

Specifies the IPv4 address of the neighbor.

*ipv6-address*

Specifies the IPv6 address of the neighbor.

*peer-group-name*

Specifies the peer group name configured by the **neighbor peer-group-name** command.

**always**

Enables this feature for route reflector (RR) routes.

## Modes

BGP configuration mode

BGP address-family IPv4 unicast VRF configuration mode

BGP address-family IPv6 unicast VRF configuration mode

## Usage Guidelines

The **no** form of the command disables this feature.

## Examples

The following example causes all updates destined for the neighbor with the IP address 10.11.12.13 to advertise this device as the next hop.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# neighbor 10.11.12.13 next-hop-self
```

The following example, for the VRF instance "red," causes all updates destined for the neighbor with the IPv6 address 2001:2018:8192::125 to advertise this device as the next hop.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv6 unicast vrf red
device(config-bgp-ipv6u-vrf)# neighbor 10.11.12.13 next-hop-self
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# neighbor next-hop-unchanged

Enables BGP to send updates to eBGP peers with the next-hop attribute unchanged.

## Syntax

```
neighbor { ip-address | ipv6-address | peer-group-name } next-hop-unchanged
```

```
no neighbor { ip-address | ipv6-address | peer-group-name } next-hop-unchanged
```

## Command Default

This functionality is not enabled.

## Parameters

*ip-address*

Specifies an IPv4 address.

*ipv6-address*

Specifies an IPv6 address.

*peer-group-name*

Specifies a peer group.

## Modes

BGP address-family L2VPN EVPN configuration mode

## Usage Guidelines

By default, BGP speakers change the next hop while sending the updates to eBGP neighbors. Use this command to override this behavior. When this command is used, the next hop attribute remains unchanged while updates are sent to eBGP peers, and the BGP speaker is forced to retain the next hop address in the BGP updates received from neighbors.

The **no** form of the command disables the sending of updates to eBGP peers with the next-hop attribute unchanged.

## Examples

The following example disables the sending of updates to eBGP peers with the next-hop attribute unchanged.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family l2vpn evpn
device(config-bgp-evpn)# no neighbor 10.11.12.13 next-hop-unchanged
```



## History

Release version	Command history
17r.1.01	This command was introduced.

# neighbor password

Specifies an MD5 password for securing sessions between the device and a neighbor.

## Syntax

**neighbor** { *ip-address* | *ipv6-address* | *peer-group-name* } **password** *string*

**no neighbor** { *ip-address* | *ipv6-address* | *peer-group-name* } **password**

## Command Default

No password is set.

## Parameters

*ip-address*

Specifies the IPv4 address of the neighbor.

*ipv6-address*

Specifies the IPv6 address of the neighbor.

*peer-group-name*

Specifies the peer group name configured by the **neighbor** *peer-group-name* command.

*string*

Password of up to 63 characters in length that can contain any alphanumeric character.

## Modes

BGP configuration mode

BGP address-family IPv4 unicast VRF configuration mode

BGP address-family IPv6 unicast VRF configuration mode

## Usage Guidelines

The **no** form of the command removes a configured MD5 password.

## Examples

The following example specifies a password for securing sessions with a specified neighbor.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# neighbor 10.11.12.13 password s0M3P@55W0Rd
```

The following BGP4+ example, for VRF instance "red," specifies a password for securing sessions with a specified neighbor.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv6 unicast vrf red
device(config-bgp-ipv4u-vrf)# neighbor 2001:2018:8192::125 password s0M3P@55W0Rd
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# neighbor peer-group

Configures a BGP neighbor to be a member of a peer group.

## Syntax

```
neighbor { ip-address | ipv6-address } peer-group string
no neighbor { ip-address | ipv6-address } peer-group string
```

## Parameters

*ip-address*

Specifies the IPv4 address of the neighbor.

*ipv6-address*

Specifies the IPv6 address of the neighbor.

**peer-group** *string*

Specifies the name of a BGP peer group. The name can be up to 63 characters in length and can be composed of any alphanumeric character.

## Modes

BGP configuration mode

BGP address-family IPv4 unicast VRF configuration mode

BGP address-family IPv6 unicast VRF configuration mode

## Usage Guidelines

The **no** form of the command removes a neighbor from the peer group.

## Examples

The following example assigns a specified neighbor to a peer group called "mypeergroup1".

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# neighbor 10.11.12.13 peer-group mypeergroup1
```

The following BGP4+ example, for VRF instance "red," assigns a specified neighbor to a peer group called "mypeergroup1".

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv6 unicast vrf red
device(config-bgp-ipv4u)# neighbor 2001:2018:8192::125 peer-group mypeergroup1
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# neighbor prefix-list

Filters the outgoing and incoming route updates to or from a particular BGP neighbor according to IP address and mask length.

## Syntax

**neighbor** { *ip-address* | *ipv6-address* | *peer-group-name* } **prefix-list** *string* { **in** | **out** }

**no neighbor** { *ip-address* | *ipv6-address* | *peer-group-name* } **prefix-list** *string* { **in** | **out** }

## Command Default

This feature is disabled.

## Parameters

*ip-address*

IPv4 address of the neighbor

*ipv6-address*

IPv6 address of the neighbor

*peer-group-name*

Peer group name configured by the **neighbor** *peer-group-name* command.

*string*

Name of the prefix list. Range is from 1 through 63 ASCII characters.

**in**

Applies the filter in incoming routes.

**out**

Applies the filter in outgoing routes.

## Modes

BGP address-family IPv4 unicast configuration mode

BGP address-family IPv6 unicast configuration mode

BGP address-family IPv4 unicast VRF configuration mode

BGP address-family IPv6 unicast VRF configuration mode

## Usage Guidelines

Use the **no** form of the command to restore the defaults.

## Examples

This example applies the prefix list "myprefixlist" to incoming advertisements to neighbor 10.11.12.13 for the default VRF.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv4 unicast
device(config-bgp-ipv4u)# neighbor 10.11.12.13 prefix-list myprefixlist in
```

This example applies the prefix list "myprefixlist" to outgoing advertisements to neighbor 2001:2018:8192::125 for the default VRF.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv6 unicast
device(config-bgp-ipv6u)# neighbor 2001:2018:8192::125 prefix-list myprefixlist out
```

This example applies the prefix list "myprefixlist" to outgoing advertisements to neighbor 2001:2018:8192::125 for VRF instance "red,".

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv6 unicast vrf red
device(config-bgp-ipv6u-vrf)# neighbor 2001:2018:8192::125 prefix-list myprefixlist out
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# neighbor remote-as

Specifies the autonomous system (AS) in which a remote neighbor resides.

## Syntax

```
neighbor { ip-address | ipv6-address | peer-group-name } remote-as num
no neighbor { ip-address | ipv6-address | peer-group-name } remote-as
```

## Command Default

No AS is specified.

## Parameters

*ip-address*

IPv4 address of the neighbor

*ipv6-address*

IPv6 address of the neighbor

*peer-group-name*

Peer group name configured by the **neighbor peer-group-name** command.

*num*

Remote AS number (ASN). Range is from 1 through 4294967295.

## Modes

BGP configuration mode

BGP address-family IPv4 unicast VRF configuration mode

BGP address-family IPv6 unicast VRF configuration mode

## Usage Guidelines

The **no** form of the command removes the neighbor from the AS.

## Examples

The following example specifies AS 100 for a neighbor.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# neighbor 10.11.12.13 remote-as 100
```



The following BGP4+ example, for VRF instance "red," specifies AS 100 for a neighbor.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv6 unicast vrf red
device(config-bgp-ipv6u-vrf)# neighbor 2001:2018:8192::125 remote-as 100
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# neighbor remove-private-as

Configures a device to remove private autonomous system numbers (ASNs) from UPDATE messages that the device sends to a neighbor.

## Syntax

```
neighbor { ip-address | ipv6-address | peer-group-name } remove-private-as
no neighbor { ip-address | ipv6-address | peer-group-name } remove-private-as
```

## Parameters

*ip-address*

IPv4 address of the neighbor

*ipv6-address*

IPv6 address of the neighbor

*peer-group-name*

Peer group name configured by the **neighbor** *peer-group-name* command.

## Modes

BGP configuration mode

BGP address-family IPv4 unicast VRF configuration mode

BGP address-family IPv6 unicast VRF configuration mode

## Usage Guidelines

The device will remove ASNs 64512 through 65535 (the well-known BGP4 private ASNs) from the AS-path attribute in UPDATE messages that the device sends to a neighbor.

The **no** form of the command restores the default so that private ASNs are not removed from UPDATE messages sent to a neighbor by a device.

## Examples

The following example removes private ASNs globally.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# neighbor 10.11.12.13 remove-private-as
```

The following example removes private ASNs for VRF instance "red".

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv6 unicast vrf red
device(config-bgp-ipv6u-vrf)# neighbor 10.11.12.13 remove-private-as
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# neighbor route-map

Filters the outgoing and incoming route updates to or from a particular BGP neighbor according to a set of attributes defined in a route map.

## Syntax

```
neighbor { ip-address | ipv6-address | peer-group-name } route-map { in string | out string }
no neighbor { ip-address | ipv6-address | peer-group-name } route-map { in string | out string }
```

## Command Default

This feature is disabled.

## Parameters

*ip-address*

IPv4 address of the neighbor

*ipv6-address*

IPv6 address of the neighbor

*peer-group-name*

Peer group name configured by the **neighbor** *peer-group-name* command.

**in**

Applies the filter on incoming routes.

*string*

Name of the route map. Range is from 1 through 63 ASCII characters.

**out**

Applies the filter on outgoing routes.

## Modes

BGP address-family IPv4 unicast configuration mode

BGP address-family IPv6 unicast configuration mode

BGP address-family IPv4 unicast VRF configuration mode

BGP address-family IPv6 unicast VRF configuration mode

BGP address-family L2VPN EVPN configuration mode

## Usage Guidelines

The **no** form of the command restores the defaults.

## Examples

The following example applies a route map named "myroutemap" to an outgoing route from 10.11.12.13.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv4 unicast
device(config-bgp-ipv4u)# neighbor 10.11.12.13 route-map out myroutemap
```

The following example applies a route map named "myroutemap" to an incoming route from 2001:2018:8192::125.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv6 unicast
device(config-bgp-ipv6u)# neighbor 2001:2018:8192::125 route-map in myroutemap
```

The following example applies a route map named "myroutemap" to an outgoing route from 10.11.12.13 in L2VPN EVPN configuration mode.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family l2vpn evpn
device(config-bgp-evpn)# neighbor 10.11.12.13 route-map out myroutemap
```

## History

Release version	Command history
16r.1.00	This command was introduced.
17r.1.01	Support was added for the BGP address-family L2VPN EVPN configuration mode.

# neighbor route-reflector-client

Configures a neighbor as a route-reflector client.

## Syntax

```
neighbor { ip-address | peer-group-name } route-reflector-client
```

```
no neighbor { ip-address | peer-group-name } route-reflector-client
```

## Parameters

*ip-address*

Specifies the IPv4 address of the neighbor

*peer-group-name*

Specifies the peer group name configured by the **neighbor** *peer-group-name* command.

## Modes

BGP configuration mode

BGP address-family IPv6 unicast configuration mode

## Usage Guidelines

Use this command on a host device to configure a neighbor to be a route-reflector client. Once configured, the host device from which the configuration is made acts as a route-reflector server.

## Examples

The following example configures a neighbor as a route-reflector client.

```
device# configure terminal
device(config)# router bgp
device(config-bgp)# address-family vpnv4 unicast
device(config-bgp-vpnv4u)# neighbor 10.11.12.13 route-reflector-client
```

## History

Release version	Command history
17r.1.01	This command was introduced.

# neighbor send-community

Enables sending the community attribute in updates to the specified BGP neighbor.

## Syntax

```
neighbor { ip-address | ipv6-address | peer-group-name } send-community [ both | extended | standard ]
```

```
no neighbor { ip-address | ipv6-address | peer-group-name } send-community [ both | extended | standard ]
```

## Command Default

The device does not send community attributes.

## Parameters

*ip-address*

IPv4 address of the neighbor

*ipv6-address*

IPv6 address of the neighbor

*peer-group-name*

Peer group name configured by the **neighbor peer-group-name** command.

**both**

Sends both standard and extended attributes.

**extended**

Sends extended attributes.

**standard**

Sends standard attributes.

## Modes

BGP address-family IPv4 unicast configuration mode

BGP address-family IPv6 unicast configuration mode

BGP address-family IPv4 unicast VRF configuration mode

BGP address-family IPv6 unicast VRF configuration mode

BGP address-family L2VPN EVPN configuration mode

BGP address-family L2VPN EVPN configuration mode

## Usage Guidelines

If the **send-community** attribute is enabled after a BGP session has been established, the neighbor session must be cleared for this change to take effect.

The **no** form of the command restores the defaults.

## Examples

The following example sends standard community attributes to a neighbor.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv4 unicast
device(config-bgp-ipv4u)# neighbor 10.11.12.13 send-community standard
%Warning: Please clear the neighbor session for the parameter change to take effect!
```

The following example sends extended community attributes to a neighbor for VRF instance "red".

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv6 unicast vrf red
device(config-bgp-ipv6u-vrf)# neighbor 2001:2018:8192::125 send-community extended
%Warning: Please clear the neighbor session for the parameter change to take effect!
```

The following example sends standard and extended community attributes to a neighbor in L2VPN EVPN configuration mode.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family l2vpn evpn
device(config-bgp-evpn)# neighbor 10.1.1.1 send-community both
%Warning: Please clear the neighbor session for the parameter change to take effect!
```

## History

Release version	Command history
16r.1.00	This command was introduced.
17r.1.01	Support was added for the BGP address-family L2VPN EVPN configuration mode.



# neighbor shutdown

Causes a device to shut down the session administratively with its BGP neighbor.

## Syntax

```
neighbor { ip-address | ipv6-address | peer-group-name } shutdown [ generate-rib-out ]
no neighbor { ip-address | ipv6-address | peer-group-name } shutdown [ generate-rib-out ]
```

## Parameters

*ip-address*

IPv4 address of the neighbor

*ipv6-address*

IPv6 address of the neighbor

*peer-group-name*

Peer group name configured by the **neighbor** *peer-group-name* command.

**generate-rib-out**

When a peer is put into the shutdown state, Routing Information Base (RIB) outbound routes are not produced for that peer. Use this option to produce those routes.

## Modes

BGP configuration mode

BGP address-family IPv4 unicast VRF configuration mode

BGP address-family IPv6 unicast VRF configuration mode

## Usage Guidelines

Shutting down a session lets you configure the neighbor and save the configuration without the need to establish a session with that neighbor.

## Examples

The following example causes a device to shut down the session administratively with its neighbor.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# neighbor 10.11.12.13 shutdown
```

The following example causes a device to shut down the session administratively with its neighbor and generate RIB outbound routes for VRF instance "red".

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv6 unicast vrf red
device(config-bgp-ipv6u-vrf)# neighbor 2001:2018:8192::125 shutdown generate-rib-out
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# neighbor soft-reconfiguration inbound

Stores all the route updates received from a BGP neighbor.

## Syntax

**neighbor** { *ip-address* | *ipv6-address* | *peer-group-name* } **soft-reconfiguration inbound**

**no neighbor** { *ip-address* | *ipv6-address* | *peer-group-name* } **soft-reconfiguration inbound**

## Parameters

*ip-address*

Specifies the IPv4 address of the neighbor

*ipv6-address*

Specifies the IPv6 address of the neighbor

*peer-group-name*

Specifies the peer group name.

## Modes

BGP configuration mode

BGP address-family IPv4 unicast VRF configuration mode

BGP address-family IPv6 unicast VRF configuration mode

## Usage Guidelines

Soft reconfiguration stores all the route updates received from a neighbor. If you request a soft reset of inbound routes, the software compares the policies against the stored route updates, instead of requesting the neighbor's BGP4 or BGP4+ route table or resetting the session with the neighbor.

## Examples

The following example globally stores route updates from a BGP4 neighbor.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# neighbor 10.11.12.13 soft-configuration inbound
```

The following example stores route updates from a BGP4+ neighbor for VRF instance "red".

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv6 unicast vrf red
device(config-bgp-ipv6u-vrf)# neighbor 2001:2018:8192::125 soft-configuration inbound
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# neighbor static-network-edge

Overrides the default BGP4 behavior and advertises the network to a neighbor or peer group only when the corresponding route is installed as a forward route in the routing table.

## Syntax

```
neighbor { ip-address | peer-group-name } static-network-edge
no neighbor { ip-address | peer-group-name } static-network-edge
```

## Parameters

*ip-address*

Specifies the IPv4 address of the neighbor

*peer-group-name*

Specifies the peer group name configured by the **neighbor** *peer-group-name* command.

## Modes

BGP configuration mode

BGP address-family IPv4 unicast VRF configuration mode

## Usage Guidelines

A BGP static network is always advertised to neighbors or a peer group, and if the corresponding route is not present in the routing table, BGP installs the null0 route. This command overrides the default behavior. This command is not supported for BGP4+.

## Examples

The following example globally overrides the default BGP4 behavior.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# neighbor 10.11.12.13 static-network-edge
```

The following example overrides the default BGP4 behavior for VRF instance "red".

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv4 unicast vrf red
device(config-bgp-ipv4u-vrf)# neighbor 10.11.12.13 static-network-edge
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# neighbor timers

Specifies how frequently a device sends KEEPALIVE messages to its BGP neighbors, as well as how long the device waits for KEEPALIVE or UPDATE messages before concluding that a neighbor is dead.

## Syntax

```
neighbor { ip-address | ipv6-address | peer-group-name } timers keep-alive keepalive_interval hold-time holdtime_interval
no neighbor { ip-address | ipv6-address | peer-group-name } timers keep-alive keepalive_interval hold-time holdtime_interval
```

## Parameters

*ip-address*

IPv4 address of the neighbor

*ipv6-address*

IPv6 address of the neighbor

*peer-group-name*

Peer group name configured by the **neighbor peer-group-name** command.

**keep-alive** *keepalive\_interval*

Frequency (in seconds) with which a device sends keepalive messages to a peer. Range is from 0 through 65535 seconds. The default is 60.

**hold-time** *holdtime\_interval*

Interval in seconds that a device waits to receive a keepalive message from a peer before declaring that peer dead. Range is from 0 through 65535 seconds. The default is 180.

## Modes

BGP configuration mode

BGP address-family IPv4 unicast VRF configuration mode

BGP address-family IPv6 unicast VRF configuration mode

## Usage Guidelines

The **no** form of the command restores the defaults.

## Examples

The following example sets the keepalive timer for a device to 120 seconds and the hold-timer to 360 seconds.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# neighbor 10.11.12.13 timers keep-alive 120 hold-time 360
```

The following example sets the keepalive timer to 120 seconds and the hold-timer to 360 seconds for VRF instance "red".

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv6 unicast vrf red
device(config-bgp-ipv6u-vrf)# neighbor 10.11.12.13 timers keep-alive 120 hold-time 360
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# neighbor unsuppress-map

Removes route suppression from BGP neighbor routes when those routes have been suppressed as a result of aggregation. All routes matching route-map rules are unsuppressed.

## Syntax

```
neighbor { ip-address | ipv6-address | peer-group-name } unsuppress-map string
no neighbor { ip-address | ipv6-address | peer-group-name } unsuppress-map string
```

## Command Default

This feature is disabled.

## Parameters

*ip-address*

IPv4 address of the neighbor.

*ipv6-address*

IPv6 address of the neighbor

*peer-group-name*

Peer group name configured by the **neighbor peer-group-name** command.

*string*

Name of the route map. Range is from 1 through 63 ASCII characters.

## Modes

BGP address-family IPv4 unicast configuration mode

BGP address-family IPv6 unicast configuration mode

BGP address-family IPv4 unicast VRF configuration mode

BGP address-family IPv6 unicast VRF configuration mode

## Usage Guidelines

Use the **no** form of the command to restore the defaults.

## Examples

The following BGP4 example removes route suppression for the default VRF.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv4 unicast
device(config-bgp-ipv4u)# neighbor 10.11.12.13 unsuppress-map myroutemap
```



The following BGP4+ example removes route suppression for VRF instance "red".

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv6 unicast
device(config-bgp-ipv6u-vrf)# neighbor 2001:2018:8192::125 unsuppress-map myroutemap
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# neighbor update-source

Configures the BGP device to communicate with a neighbor through a specified interface.

## Syntax

```
neighbor { ip-address | ipv6-address | peer-group-name } update-source { ip-address | ethernet slot / port | loopback num |
ve-interface vlan_id }
```

```
no neighbor { ip-address | ipv6-address | peer-group-name } update-source { ip-address | ethernet slot / port | loopback
num | ve-interface vlan_id }
```

## Command Default

Disabled.

## Parameters

*ip-address*

IPv4 address of the neighbor

*ipv6-address*

IPv6 address of the neighbor

*peer-group-name*

Peer group name configured by the **neighbor peer-group-name** command.

*ip-address*

IP address of the update source.

**ethernet**

Specifies an ethernet interface.

*slot*

Specifies a valid slot number.

*port*

Specifies a valid port number.

**loopback num**

Specifies a loopback interface.

**ve-interface vlan\_id**

Specifies a virtual Ethernet VLAN interface.

## Modes

BGP configuration mode

BGP address-family IPv4 unicast VRF configuration mode

BGP address-family IPv6 unicast VRF configuration mode

## Usage Guidelines

Use the **no** form of the command to restore the defaults.

## Examples

The following example configures the device to communicate with a neighbor through the specified IPv4 address and Ethernet interface 3/2.

```
device#configure terminal
device#(config)# router bgp
device(config-bgp-router)# neighbor 10.11.12.13 update-source ethernet 3/2
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# neighbor weight

Specifies a weight that the device will add to routes that are received from the specified BGP neighbor.

## Syntax

**neighbor** { *ip-address* | *ipv6-address* | *peer-group-name* } **weight** *num*

**no neighbor** { *ip-address* | *ipv6-address* | *peer-group-name* } **weight**

## Command Default

The default for *num* is 0.

## Parameters

*ip-address*

IPv4 address of the neighbor.

*ipv6-address*

IPv6 address of the neighbor

*peer-group-name*

Name of the peer group.

*num*

Value from 1 through 65535.

## Modes

BGP address-family IPv4 unicast configuration mode

BGP address-family IPv6 unicast configuration mode

BGP address-family IPv4 unicast VRF configuration mode

BGP address-family IPv6 unicast VRF configuration mode

## Usage Guidelines

Use the **no** form of the command to restore the defaults.

BGP prefers larger weights over smaller weights.

## Examples

This example changes the weight from the default.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv4 unicast
device(config-bgp-ipv4u)# neighbor 10.11.12.13 weight 100
```

This example changes the weight from the default for VRF instance "red".

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv6 unicast vrf red
device(config-bgp-ipv6u-vrf)# neighbor 2001:2018:8192::125 weight 100
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# net

Configures an Intermediate System-to-Intermediate System (IS-IS) network entity title (NET) for the routing process.

## Syntax

**net** *NSAP address*

**no net** *NSAP address*

## Command Default

900 seconds (15 minutes).

## Parameters

*NSAP address*

Specifies a Network Service Access Point (NSAP) address; composed of both an area ID and a system ID.

## Modes

IS-IS router configuration mode

## Usage Guidelines

The *area-id* parameter specifies the area and has the format *xx* or *xx.xxxx*. For example, 49 and 49.2211 are valid area IDs.

The *system-id* parameter specifies the device's unique IS-IS router ID and has the format *xxxx.xxxx.xxxx*. You can specify any value for the system ID. A common practice is to use the base MAC address of the device as the system ID. The base MAC address is also the MAC address of port 1.

You must use the same system ID in all the NETs on the device.

The **no** form of the command removes the configured NET.

## Examples

The following example configures a NET that has the area ID 49.2211, the system ID 0000.00bb.cccc (the base MAC address), and the SEL value 00.

```
device# configure terminal
device(config)# router isis
device(config-isis-router)# net 49.2211.0000.00bb.cccc.00
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# network

Configures the device to advertise a BGP network.

## Syntax

**network** *network/mask* [ **backdoor** | **route-map** *map-name* | **weight** *num* ]

**no network** *network/mask* [ **backdoor** | **route-map** *map-name* | **weight** *num* ]

## Command Default

No network is advertised.

## Parameters

*network/mask*

Network and mask in CIDR notation.

**backdoor**

Changes administrative distance of the route to this network from the eBGP administrative distance (the default is 20) to the local BGP weight (the default is 200), tagging the route as a backdoor route.

**route-map** *map-name*

Specifies a route map with which to set or change BGP attributes for the network to be advertised. Range is from 1 through 63 ASCII characters.

**weight***num*

Specifies a weight to be added to routes to this network. Range is 0 through 65535. The default is 0.

## Modes

BGP address-family IPv4 unicast configuration mode

BGP address-family IPv6 unicast configuration mode

BGP address-family IPv4 unicast VRF configuration mode

BGP address-family IPv6 unicast VRF configuration mode

## Usage Guidelines

Use the **no** form of the command to restore the defaults.

## Examples

This example imports the IP prefix 10.1.1.1/32 into the BGP4 database and specifies a route map called "myroutemap".

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv4 unicast
device(config-bgp-ipv4u)# network 10.1.1.1/32 route-map myroutemap
```

This example imports the IPv6 prefix 2001:db8::/32 into the BGP4+ database and sets a weight of 300.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv6 unicast
device(config-bgp-ipv6u)# network 2001:db8::/32 weight 300
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# next-hop-enable-default

Configures the device to use the BGP default route as the next hop.

## Syntax

`next-hop-enable-default`

`no next-hop-enable-default`

## Command Default

This feature is disabled.

## Modes

BGP address-family IPv4 unicast configuration mode

BGP address-family IPv6 unicast configuration mode

BGP address-family IPv4 unicast VRF configuration mode

BGP address-family IPv6 unicast VRF configuration mode

## Usage Guidelines

The **no** form of the command restores the default.

## Examples

The following BGP4 example configures the device to use the default route as the next hop for the default VRF.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv4 unicast
device(config-bgp-ipv4u)# next-hop-enable-default
```

The following BGP4+ example configures the device to use the default route as the next hop for the default VRF.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv6 unicast
device(config-bgp-ipv6u)# next-hop-enable-default
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# next-hop-mpls

Configures BGP shortcuts using next-hop MPLS to force BGP to use an MPLS tunnel as the preferred route to a destination network when an MPLS LSP tunnel is available.

## Syntax

```
next-hop-mpls [ compare-lsp-metric | follow-igp ]
```

```
no next-hop-mpls [ compare-lsp-metric | follow-igp ]
```

## Command Default

BGP uses the default BGP decision process and native IP forwarding to build BGP EMCP routes. Only IP routing tables are used to resolve routes for the routing table.

## Parameters

### compare-lsp-metric

Enables BGP to compare the configured LSP metrics as the IGP cost for the next hop.

### follow-igp

Ignores the MPLS metric cost in the BGP decision process and uses the IGP cost. BGP checks when an MPLS LSP is present, and totally ignores the LSP metric.

## Modes

BGP address-family IPv4 unicast configuration mode

## Usage Guidelines

When the **next-hop-mpls** command is enabled without either option, BGP sets the LSP metrics to one.

Enabling or disabling an option takes effect immediately. BGP automatically recalculates the existing BGP routes.

The **compare-lsp-metric** and **follow-igp** options are mutually exclusive.

When the **compare-lsp-metric** option is configured and you change the LSP metric, the routing table is updated.

Use the **no** form of the command to disable global next-hop MPLS.

When you use the **no** form of the command with the **compare-lsp-metric** or **follow-igp** option, all LSP metrics become equal cost. However, global next-hop MPLS remains enabled.

For the **follow-igp** option, consider the following:

- When you are running IGP throughout the network, and the IGP metric is trusted in the entire domain, you may want to rely on this IGP metric to make a best path and forwarding decision, regardless of whether the forwarding happens in native IP or MPLS encapsulation.
- The MPLS metric is manually configured in each LSP. There is no dynamic way to tie MPLS metric with an IGP metric. When using MPLS LSP as a BGP route outgoing interface, you loses the ability to tie the forwarding decision with a unified IGP metric.

- When combined with the BGP **install-igp-cost** command, you can change the route cost from BGP MED to IGP cost and is used when BGP routes are added to the RTM.
- When combined with a BGP outbound policy for route **set metric-type internal** command, you can set Layer-3 VPN and IP over MPLS routes using IGP metric to send out as the BGP MED value.

## Examples

The following example enables BGP shortcuts through next-hop MPLS and BGP to set the next hop IGP cost to one instead of the actual LSP metric.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv4 unicast
device(config-bgp-ipv4u)# next-hop-mpls
```

The following example enables BGP shortcuts through next-hop MPLS and BGP to use the configured LSP metrics as the IGP cost for the next hop.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv4 unicast
device(config-bgp-ipv4u)# next-hop-mpls compare-lsp-metric
```

The following example enables BGP shortcuts through next-hop MPLS and BGP to ignore the LSP metrics and to use the IGP cost for the next hop.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv4 unicast
device(config-bgp-ipv4u)# next-hop-mpls follow-igp
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# next-hop-recursion

Enables BGP recursive next-hop lookups.

## Syntax

`next-hop-recursion`

`no next-hop-recursion`

## Command Default

This feature is disabled.

## Modes

BGP address-family IPv4 unicast configuration mode

BGP address-family IPv6 unicast configuration mode

## Usage Guidelines

Use the **no** form of this command to restore the default.

If the BGP next hop is not the immediate next hop, a recursive route lookup in the IP routing information base (RIB) is needed. With recursion, a second routing lookup is required to resolve the exit path for destination traffic. Use this command to enable recursive next-hop lookups.

## Examples

This example enables recursive next-hop lookups for BGP4.

```
device# configure terminal
device(config)# address-family ipv4 unicast
device(config-bgp-ipv4u)# next-hop-recursion
```

This example enables recursive next-hop lookups for BGP4+.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv6 unicast
device(config-bgp-ipv6u)# next-hop-recursion
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# node

Penalizes all links originating from the node IP address.

## Syntax

```
node { ip_addr }
no node { ip_addr }
```

## Command Default

The command is disabled, by default.

## Parameters

*ip\_addr*  
All links that originate from the specified IP address are penalized.

## Modes

MPLS CSPF-group configuration mode.

## Usage Guidelines

The **no** form of the command disables the configuration.

## Examples

The example below configures a fate sharing group and specifies node 10.1.1.1 as the penalizing IP address.

```
device# configure
device(config)# router mpls
device(config-router-mpls)# policy
device(config-router-mpls-policy)# cspf-group computation-mode add-penalty
device(config-router-mpls-policy)# exit
device(config-router-mpls)# cspf-group group3
device(config-router-mpls-cspf-group-group3)# penalty 100
device(config-router-mpls-cspf-group-group3)# from 10.1.1.1
device(config-router-mpls-cspf-group-group3)# link 10.1.1.1 10.1.1.2
device(config-router-mpls-cspf-group-group3)# subnet 10.1.2.0/24
device(config-router-mpls-cspf-group-group3)# node 10.1.1.1
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# nonstop-routing (IS-IS)

Enables nonstop routing (NSR) for Intermediate System-to-Intermediate System (IS-IS).

## Syntax

**nonstop-routing**

**no nonstop-routing**

## Command Default

Enabled

## Modes

IS-IS router configuration mode

## Usage Guidelines

The **no** form of the command disables nonstop routing.

## Examples

The following example enables NSR for IS-IS on a device.

```
device# configure terminal
device(config)# router isis
device(config-isis-router)# nonstop-routing
```

The following example disables NSR for IS-IS on a device.

```
device# configure terminal
device(config)# router isis
device(config-isis-router)# no nonstop-routing
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# nonstop-routing (OSPF)

Enables nonstop routing (NSR) for OSPF.

## Syntax

**nonstop-routing**

**no nonstop-routing**

## Command Default

Enabled.

## Modes

OSPF router configuration mode

OSPFv3 router configuration mode

OSPF router VRF configuration mode

OSPFv3 router VRF configuration mode

## Usage Guidelines

The **no** form of the command disables non-stop routing.

## Examples

The following example re-enables NSR on a device.

```
device# configuration terminal
device(config)# ipv6 router ospf
device(config-ipv6-router-ospf-vrf-default-vrf)# nonstop-routing
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# notification-timer

Sets the length of the EOL notification timer for LDP-IGP synchronization.

## Syntax

**notification-timer** *milliseconds*

**no notification-timer** *milliseconds*

## Command Default

The default value is 60000 milliseconds.

## Parameters

*milliseconds*

Specifies the length of the EOL notification timer in milliseconds. Enter an integer from 100 to 120000.

## Modes

MPLS LDP end-of-lib (eol) configuration mode

## Usage Guidelines

Use the **no** form of the command to reset the default value.

## Examples

The following example configures the EOL notification timer to 80000 milliseconds.

```
device(config)# router mpls
device(config-mpls)# ldp
device(config-mpls-ldp)# end-of-lib
device(config-mpls-ldp-eol)# notification-timer 80000

device(config)# router mpls
device(config-router-mpls)# ldp
device(config-router-mpls-ldp)# eol
device(config-router-mpls-ldp-eol)# notification-timer 80000
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# ntp authentication-key

Creates an authentication key to associate with the NTP server, thereby enabling NTP authentication.

## Syntax

```
ntp authentication-key key-id {md5 md5-string | sha1 sha1-string} encryption-level enc_value
no ntp authentication-key key-id
```

## Command Default

NTP authentication is disabled by default.

## Parameters

*key-id*

Specifies an ID for an authentication key. The range is from 1 through 65535.

**md5** *md5-string*

Specifies a string for the MD5 message-digest algorithm. The string can be a maximum of 15 ASCII characters.

**encryption-level** *enc\_value*

Defines the level of encryption for the NTP authentication key. The valid values are 0 and 7. The value 0 is clear text format and the value 7 is fully encrypted format. The default value is 7.

**sha1** *sha1-string*

Specifies a string for SHA1 encryption. The string can be a maximum of 15 ASCII characters.

## Modes

Global configuration mode

## Usage Guidelines

This command adds an NTP authentication key to a list of authentication keys in the database. The key is shared by the client (device) and an external NTP server.

The maximum number of configurable NTP authentication keys is five. You cannot configure a duplicate key ID with a different key string. Use the **no ntp authentication-key** *key-id* command to remove the specified authentication key.

Authentication key must be created before associating the key with any server. Refer to the **ntp server** command for information on how to create this association.

Before downgrading the firmware to a version that does not support the encryption-level option, the encryption-level should be set to 0.

## Examples

To create an authentication key with an ID of 33, an MD5 string called *check*, and an encryption level of 0 :

```
device# configure
device(config)# ntp authentication-key 33 md5 check encryption-level 0
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ntp server

Specifies or adds an NTP server IP address and optionally associates an authentication key to the server.

## Syntax

```
ntp server ip-address [ key key-id ] [ use-vrf vrf-name ]
no ntp server ip-address [ key key-id ] [ use-vrf vrf-name ]
```

## Command Default

The NTP server list is LOCL (no NTP server configured).

## Parameters

*ip-address*

Specifies the NTP server IPv4 IP address (dot-decimal notation) or the IPv6 IP address (hexadecimal colon-separated notation).

**key** *key-id*

Associates a key from the key list to the specified server. The range for a key ID is from 1 through 65535.

**use-vrf** *vrf-name*

Specifies a VRF through which to communicate with the NTP server. See the Usage Guidelines.

## Modes

Global configuration mode

## Usage Guidelines

Use this command to add an NTP server IPv4 or IPv6 address to a list of server IP addresses, or to associate an existing authentication key with an NTP server IP address.

The maximum number of NTP servers allowed is five.

Network Time Protocol (NTP) commands must be configured on each individual switch.

Use the **no ntp server ip-address** command to remove the specified NTP server IP address. Removing the current active NTP server resets the NTPstatus to "LOCL" until a new, active server is selected.

Use the **no ntp server ip-address key key-id** command to remove the key from the specified NTP IP address.

By default, all management services are enabled on the management VRF ("mgmt-vrf") and the default VRF ("default-vrf").

## Examples

To associate a configured key ID of 15 to an NTP server on the management VRF:

```
device# configure terminal
device(config)# ntp server 192.168.10.1 key 15
```

To associate a configured key ID of 15 to an NTP server on a user-specified VRF:

```
device# configure terminal
device(config)# ntp server 192.168.10.1 key 15 use-vrf myvrf
```

To remove an NTP server from the current list of NTP servers on the management VRF:

```
device# configure terminal
device(config)# no ntp server 192.168.10.1
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ntp source-ip

Configures the source IP address to be used to access the NTP server.

## Syntax

```
ntp source-ip [ chassis-ip ip_address | mm-ip ip_address]
no ntp source-ip
```

## Command Default

The NTP source IP is not configured.

## Parameters

**chassis-ip** *ip\_address*

Uses the IP address of the chassis for the NTP server.

**mm-ip** *ip\_address*

Uses the management module (MM) IP address for the NTP server.

## Modes

Global configuration mode

## Usage Guidelines

Use the **no ntp source-ip** command to remove the configuration.

## Examples

Typical command example:

```
device# configure terminal
device(config)# ntp source-ip chassis-ip 10.28.52.26
```

Typical command example:

```
device# configure terminal
device(config)# ntp source-ip mm-ip 10.28.52.27
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# openflow default-behavior send-to-controller

Configures the OpenFlow default behavior to send to controller.

## Syntax

```
openflow default-behavior send-to-controller
```

```
no openflow default-behavior send-to-controller
```

## Modes

Global configuration mode

## Usage Guidelines

The device uses default behavior command for packets, which don't match any OpenFlow flows.

Use no form to disable the flows to send to controller.

## Examples

To configure OpenFlow default behavior globally, enter the following command.

```
device(config)# openflow default-behavior send-to-controller
```

To disable the command, enter the following command.

```
device(config)# no openflow default-behavior send-to-controller
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# openflow enable

Enables the OpenFlow mode globally or on an interface. Configures OpenFlow hybrid mode on an interface.

## Syntax

**openflow enable ofv13**

**openflow enable** [ *layer2* ] [ *layer3* ] [ *layer23* ] [ *hybrid-mode* ] [ *egress* ]

**no openflow enable**

## Command Default

OpenFlow is disabled on the device.

## Parameters

**ofv13**

Specifies OpenFlow protocol 1.3.0.

**layer2**

Matches only on Layer 2 packet headers.

**layer3**

Matches only on Layer 3 packet headers.

**layer23**

Matches only on Layer 23 packet headers.

**hybrid-mode**

Specifies the OpenFlow hybrid mode.

**egress**

Specifies the OpenFlow egress interface.

## Modes

Global configuration mode

Interface configuration mode

## Usage Guidelines

Use the **no** form to disable the OpenFlow on the interface or globally.

When the switch connects to the controller the switch advertises the configured OpenFlow version to the controller.

An OpenFlow must be configured globally, before you configure on an interface.

To change from one mode to another, you disable the working mode and then configure the new mode.

Prerequisites to configure OpenFlow hybrid mode on an interface:

- Openflow must be enabled globally.

- Switchport must be configured on the interface.
- Switchport mode trunk must be configured on the interface.

Prerequisites to configure OpenFlow egress on an interface:

- Egress port-mode is applicable only for LAGs.
- OpenFlow cannot be enabled in egress mode on physical interfaces.
- OpenFlow must be enabled only in egress mode on port-channels.
- OpenFlow cannot be enabled in Layer2, Layer3, Layer23, or hybrid-mode, when egress mode is enabled on port-channel.

## Examples

To enable OpenFlow globally, enter the following command.

```
device(config)# openflow enable ofv13
```

To enable OpenFlow on an interface and match on Layer 2 packet headers, enter the following command.

```
device(config)# Ethernet 3/1
device(conf-if-eth-3/1)# openflow enable layer2
```

To disable on Layer 2 packet headers, enter the following command.

```
device(conf-if-eth-3/1)# no openflow enable
```

To match on Layer 3 packet headers, enter the following command.

```
device(config)# Ethernet 3/2
device(conf-if-eth-3/2)# openflow enable layer3
```

To match on Layer 23 packet headers, enter the following command.

```
device(config)# Ethernet 3/3
device(conf-if-eth-3/3)# openflow enable layer23
```

To configure OpenFlow hybrid mode on an interface, enter the following command.

```
device(config)# interface Ethernet 3/1
device(conf-if-eth-3/1)# switchport
device(conf-if-eth-3/1)# switchport mode trunk
device(conf-if-eth-3/1)# openflow enable layer23 hybrid-mode
```

To configure OpenFlow on LAG port, enter the following command.

```
device(config)# interface Port-channel 10
device(config-Port-channel-10)# openflow enable egress
```

## History

Release version	Command history
16r.1.00	This command was introduced.
17r.1.00	This command was modified for egress option.



# openflow-controller

Configures an OpenFlow controller in active connection mode.

## Syntax

```
openflow-controller controller-name
```

```
openflow-controller ip-address [ no-ssl | ssl ] [ port port-number ] [ use-vrf vrf name ]
```

```
no openflow-controller controller-name
```

## Command Default

See the Usage Guidelines.

## Parameters

*controller-name*

Specifies the user-given name for the controller.

**ip-address**

Specifies the IPv4 address of the controller.

**use-vrf**

Specifies the VRF name to connect to the OpenFlow controller.

**ssl**

Specifies an SSL connection.

**no-ssl**

Specifies a TCP connection.

**port** *port-number*

Specifies the OpenFlow controller TCP port number. Range is from 1 through 65535.

## Modes

Global configuration mode

## Usage Guidelines

SSL is default for the connection method. *no-ssl* option indicates to use TCP instead of SSL. The default port is 6633.

If no VRF name is specified, *mgmt-vrf* is the default VRF.

Use the **no** form of the command to remove the specified OpenFlow controller. You cannot remove an active controller.

## Examples

This example creates an OpenFlow controller and assigns an IPv4 address and port.

```
device(config)# openflow controller A1 ip-address 10.25.128.185 no-ssl port 9000
device(config)# openflow controller A2 ip-address 10.25.128.185 no-ssl
device(config)# no openflow controller A2
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# openflow-mirror destination

Specifies the mirror port to redirect the traffic along with Normal action.

## Syntax

```
openflow-mirror destination ethernet slot /port
```

```
no openflow-mirror destination ethernet
```

## Parameters

### ethernet

Specifies the ethernet interface for the device.

### slot

Specifies the slot number.

### port

Specifies the port number.

## Modes

Global configuration mode.

## Usage Guidelines

OpenFlow must be enabled globally.

Maximum of 2 mirror ports can be configured.

Use the no form of this command to delete the mirror port configuration.

## Examples

Use the following command to mirror the port.

```
device(config)# openflow-mirror destination ethernet 3/1
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# openflow protected-vlans

Configures an OpenFlow protected VLAN.

## Syntax

```
openflow protected-vlans add[vlan id | vlan range]
```

```
openflow protected-vlans remove [vlan id | vlan range]
```

## Parameters

**vlan id**

Specifies the VLAN ID of the interface.

**vlan range**

Specifies the range of VLAN IDs of the interface.

## Modes

Global configuration mode

## Usage Guidelines

OpenFlow protected VLANs can be preconfigured even when OpenFlow is not enabled on the interface.

If protected VLAN is configured on the interface, only OpenFlow hybrid mode can be configured on that interface.

## Examples

This example adds the VLANs on the interface.

```
device(config)# interface Ethernet 3/1
device(conf-if-eth-3/1)# openflow protected-vlans add 201, 204, 206
```

This example adds the VLAN range on the interface.

```
device(config)# interface Ethernet 3/2
device(conf-if-eth-3/2)# openflow protected-vlans add 10-20
```

To remove protected VLANs from the interface, use this command.

```
device(conf-if-eth-3/2)# openflow protected-vlans remove 10-20
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# openflow ingress-replication group-id-range

Configures the Openflow group ID range with ingress replication.

## Syntax

**openflow ingress-replication group-id-range group ID - group ID**

**no openflow ingress-replication group-id-range**

## Parameters

**group ID**

Displays the group ID number

**group-id-range**

Displays the group ID range.

## Modes

Global configuration mode.

## Usage Guidelines

System reload is required when group-id-range is changed. A warning is displayed, while configuring this command.

The minimum group ID value is 0, and the maximum group ID value is 4294967295.

Use no form to delete the ingress replication for the configured group ID range.

## Examples

Use the following command to configure the OpenFlow group ID range with ingress replication:

```
device(config) # openflow ingress-replication group-id-range 100-1000
%Warning:To activate the ingress-replication group id range, please run
'copy running-config startup-config' followed by reload system.
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# oscmd

Runs commands or scripts supported by the Linux OS directly from the SLX-OS CLI.

## Syntax

```
oscmd { Linux-command | script-name }
```

## Parameters

*Linux-command*

Specifies the Linux command that you want to run.

*script-name*

Specifies the script that you want to run.

## Modes

Privileged EXEC mode

## Usage Guidelines

This command is only available for users with admin-level permissions.

All scripts run under **oscmd** must have execute permission.

After writing and testing a user-defined script file, you can copy it to the Extreme device. Imported scripts are stored in the `/var/config/vcs/scripts` directory.

You can also create scripts from the Linux shell using the "vi" editor. The newly-created scripts must exist in the `/fabos/users/admin` directory.

Although as an SLX-OS admin you have permissions to run the following commands from the Linux shell, you do not have permissions to run them—from the SLX-OS CLI—appended to the **oscmd** command.

- **bash**
- **script**
- **vi**
- **vim**

## Examples

In the following example, the Linux **ps -ef** command lists the process status from the CLI.

```
device# oscmd ps -ef
UID      PID  PPID  C  STIME TTY          TIME CMD
root      1    0    0  Jul24 ?           00:00:04 /sbin/init
root      2    0    0  Jul24 ?           00:00:00 [kthreadd]
root      3    2    0  Jul24 ?           00:00:00 [migration/0]
root      4    2    0  Jul24 ?           00:00:03 [ksoftirqd/0]
root      5    2    0  Jul24 ?           00:00:00 [migration/1]
root      6    2    0  Jul24 ?           00:00:03 [ksoftirqd/1]
root      7    2    0  Jul24 ?           00:00:00 [migration/2]
root      8    2    0  Jul24 ?           00:00:02 [ksoftirqd/2]
root      9    2    0  Jul24 ?           00:00:00 [migration/3]
root     10    2    0  Jul24 ?           00:00:02 [ksoftirqd/3]
root     11    2    0  Jul24 ?           00:00:00 [migration/4]
root     12    2    0  Jul24 ?           00:00:02 [ksoftirqd/4]
root     13    2    0  Jul24 ?           00:00:00 [migration/5]
root     14    2    0  Jul24 ?           00:00:03 [ksoftirqd/5]
root     27    2    0  Jul24 ?           00:00:00 [cpuset]
root     28    2    0  Jul24 ?           00:00:01 [khelper]
root     31    2    0  Jul24 ?           00:00:00 [netns]
root     34    2    0  Jul24 ?           00:00:00 [async/mgr]
root    270    2    0  Jul24 ?           00:00:00 [sync_supers]
root    272    2    0  Jul24 ?           00:00:00 [bdi-default]

...

root      8kblockd/6]182      1  0  Jul24 ?           00:00:00 /usr/sbin/inetd
root      8237      1  0  Jul24 ?           00:00:00 /usr/sbin/sshd
admin    27536 27535  0 04:19 pts/4      00:00:00 ps -ef
```

In the following example, "my\_script" is the name of a user-defined script that is downloaded by using the **copy** command or exists in the /fabos/users/admin directory; and is executable under the Linux OS.

```
device# oscmd my_script
```

## History

Release version	Command history
16r.1.00	This command was introduced.
16r.1.01	This command was modified to add user-defined script information and a list of unsupported Linux commands.
17r.1.00	This topic was modified to reflect the modification of the <b>start-shell</b> command. Even after entering <b>start-shell</b> , you cannot access Linux commands that require root permissions.

# overlay access-group

Configures an overlay access-list under overlay-transit.

## Syntax

```
overlay access-group overlay-vxlan-acl-name in
no overlay access-group
```

## Parameters

*overlay-vxlan-acl-name*

The overlay access-list name.

in

Applies overlay access-list to ingress traffic.

## Modes

Overlay-transit mode.

## Usage Guidelines

You must create an overlay access-list before to apply under overlay-transit.

Use the **no** form of this command to delete the overlay access list.

## Examples

This example creates an overlay access list.

```
device # configure terminal
device(config)# overlay-transit tr_name
device(config-overlay-transit-tr_name)# overlay access-group abc_ext in
```

This example deletes an overlay access list.

```
device(config-overlay-transit-vxlan1)# no overlay access-group abc_ext
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# overlay access-list type vxlan extended

Creates an access-list with extended headers for deep inspection. Extended access-list allows to configure VXLAN tunnel endpoints (VTEP source and destination IP), VNI and VNI IP range, inner source and destination IP and networks and inner source and destination ports.

## Syntax

```
overlay access-list type vxlan extended user-acl-name
no overlay access-list type vxlan extended user-acl-name
```

## Parameters

*user-acl-name*  
Specifies the user ACL name.

## Modes

Global configuration mode.

## Usage Guidelines

Use the **no** form of this command to delete an extended access-list.

## Examples

This example creates an extended access-list.

```
device# configure terminal
device(config)# overlay access-list type vxlan extended abc_ext
2016/08/15-23:29:09, [SSMD-1400], 4282, M1 | Active | DCE, INFO, SLX, Overlay access list abc_ext is
created.
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# overlay access-list type vxlan standard

Enables configuring only the VXLAN tunnel endpoint (VTEP) IP address and VXLAN Network Identifier (VNI) to match.

## Syntax

```
overlay access-list type vxlan standard user-acl-name
```

```
no overlay access-list type vxlan standard user-acl-name
```

## Parameters

*user-acl-name*

The user ACL name.

## Modes

Global configuration mode

## Usage Guidelines

Use the **no** form of this command to delete a standard access-list.

## Examples

This example creates a standard access-list.

```
device# configure terminal
device(config)# overlay access-list type vxlan standard overlay_vxlan_std
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# overlay-gateway

Creates a VXLAN overlay gateway instance and enables VXLAN overlay gateway configuration mode.

## Syntax

**overlay-gateway** *name*

**no overlay-gateway** *name*

## Parameters

*name*

Specifies a name for the VXLAN overlay gateway. Only one gateway instance can be configured. The name is an alphanumeric, 32-character-maximum string that can also contain hyphens and underscores.

## Modes

Global configuration mode

## Usage Guidelines

Use this command to create a VXLAN overlay gateway instance with the given name. An overlay network is a virtual network that is built on top of existing network Layer 2 and Layer 3 technologies. Setting up a gateway consists of the following:

- Configuring the source IP address
- Configuring the VLAN or bridge domain
- Mapping a bridge domain to a VNI
- Configuring MAC addresses to export to the VXLAN domain
- Enabling statistics collection for VLAN domains
- Enabling SPAN

Once you create the gateway instance, you enter VXLAN overlay gateway configuration mode, where you can configure other properties for this gateway. The key commands available in this mode are summarized below:

**TABLE 4** Key commands available in VXLAN overlay gateway configuration mode

Command	Description
<b>activate</b>	Activates a VXLAN overlay gateway instance.
<b>ip interface loopback</b>	Sets the loopback port number for the overlay gateway instance.
<b>map bridge-domain</b>	In a VXLAN overlay gateway configuration that uses the Layer 2 extension, maps a bridge domain with VXLAN Network Identifiers (VNIs).
<b>map vlan</b>	In a VXLAN overlay gateway configuration that uses Layer 2 extension, associates VLANs with VXLAN Network Identifiers (VNIs).
<b>sflow</b>	Enables sFlow monitoring of the tunnel endpoints for a VXLAN overlay gateway.
<b>site</b>	Configures a remote Layer 2 extension site in a VXLAN overlay gateway context.

**TABLE 4** Key commands available in VXLAN overlay gateway configuration mode (continued)

Command	Description
<b>type layer2-extension</b>	Specifies that a VXLAN overlay gateway uses Layer 2 extension.

Only one VXLAN overlay gateway instance can be configured.

Use the **no overlay-gateway** command to delete the VXLAN overlay gateway instance from the cluster. All tunnels for the gateway are also deleted. There are no other **no** forms of this command.

By default, a VXLAN overlay gateway instance is inactive. To activate an instance, first configure its other properties (such as which devices it attaches to), and then enter the **activate** command.

## Examples

The following example creates a VXLAN overlay gateway instance named gateway1 and accesses VXLAN overlay gateway configuration mode.

```
device# configure terminal
device(config)# overlay-gateway gateway1
device(config-overlay-gw-gateway1)#
```

## History

Release version	Command history
17r.1.00	This command was introduced.
17r.1.01	Added bridge domain support information.

# overlay-service-policy

Binds an overlay policy map to an overlay gateway or overlay transit instance.

## Syntax

```
overlay-service-policy { in } policy-mapname
no overlay-service-policy{ in } policy-mapname
```

## Command Default

No overlay policy map is bound.

## Parameters

**in**  
Specifies that the policy be applied on ingress traffic (required).

*policy-mapname*  
Name of an overlay policer policy map.

## Modes

Overlay gateway instance configuration mode  
Overlay transit instance configuration mode

## Usage Guidelines

Only ingress policies are supported.  
Overlay transit instances are applicable to spine nodes only in an IP Fabric.  
Use the **no** form of the command to unbind the policy.

## Examples

The following example binds a policy map to an overlay gateway instance.

```
device# configure terminal
device(config)# overlay-gateway gw1
device(conf-overlay-gw-gw1)# overlay-service-policy in servicepolicy1
```

The following example binds a policy map to an overlay transit instance on a spine node.

```
device# configure terminal
device(config)# overlay-transit transit1
device(conf-overlay-transit-transit1)# overlay-service-policy in servicepolicy1
```

The following example unbinds the policy map from the above instance.

```
device# configure terminal
device(config)# overlay-transit myOTinstance
device(conf-overlay-transit-transit1)# no overlay-service-policy in servicepolicy1
```

## History

Release version	Command history
17r.1.01	This command was introduced.

# overlay-transit

Configures an overlay transit.

## Syntax

```
overlay-transit overlay-transit-name
```

```
no overlay-transit overlay-transit-name
```

## Parameters

*overlay-transit-name*

The overlay transit name.

## Modes

Global configuration mode.

## Usage Guidelines

Use the **no** form of this command to delete the overlay transit configuration.

## Examples

This example configures an overlay transit.

```
device# configure terminal
device(config)# overlay-transit vlx_transit
```

This example deletes an overlay transit configuration.

```
device(config)# no overlay-transit vlx_transit
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# partial-spf-interval

Changes the partial shortest path first (PSPF) interval.

## Syntax

```
partial-spf-interval max-wait initial-wait second-wait
no partial-spf-interval
```

## Parameters

*max-wait*

Specifies the maximum interval in seconds between SPF recalculations. The range is from 0 through 120 seconds. The default is 5 seconds.

*initial-wait*

Specifies the initial SPF calculation delay in milliseconds after an LSP change. The range is from 0 through 120000 milliseconds. The default for this variable is value of the *max-wait* time.

*second-wait*

Indicates the hold time between the first and second SPF calculation in milliseconds. The range is from 1 through 120000 milliseconds. The default is 5000 milliseconds (5 seconds). The default for this variable is value of the *max-wait* time.

## Modes

IS-IS router configuration mode

## Usage Guidelines

The **no** form of the command restores the defaults.

## Examples

The following example specifies that the maximum interval between SPF recalculations is 15 seconds, the initial SPF calculation delay is 10000 milliseconds, and the hold time between the first and second SPF calculation is 15000 milliseconds.

```
device# configure terminal
device(config)# router isis
device(config-isis-router)# partial-spf-interval 15 10000 15000
```

The following example restores the default values.

```
device# configure terminal
device(config)# router isis
device(config-isis-router)# no partial-spf-interval
```



## History

Release version	Command history
16r.1.00	This command was introduced.

# password-attributes

Configures global password attributes.

## Syntax

```
password-attributes { [ max-retry maxretry ] [ min-length minlen ] [ max-lockout-duration duration ] [ admin-lockout |
character-restriction { [ lower numlower ] [ numeric numdigits ] [ special-char numsplchars ] [ upper numupper ] } } }
no password-attributes { [ max-retry maxretry ] [ min-length minlen ] [ max-lockout-duration duration ] [ admin-lockout |
character-restriction { [ lower numlower ] [ numeric numdigits ] [ special-char numsplchars ] [ upper numupper ] } } }
```

## Command Default

The default for *min-length* is 8. All other defaults are 0.

## Parameters

### admin-lockout

Enables lockout for admin role accounts.

### character-restriction

Configures the restriction on various types of characters.

#### lower *numlower*

Specifies the minimum number of lowercase alphabetic characters that must occur in the password. Values range from 0 through 32 characters. The default value is 0.

#### numeric *numdigits*

Specifies the minimum number of numeric characters that must occur in the password. Values range from 0 through 32 characters. The default is 0.

#### special-char *numsplchars*

Specifies the number of punctuation characters that must occur in the password. All printable, nonalphanumeric punctuation characters, except colon (:) are allowed. Values range from 0 through 32 characters. The default value is 0.

#### upper *numupper*

Specifies the minimum number of uppercase alphabetic characters that must occur in the password. Values range from 0 through 32 characters. The default value is 0.

### max-retry *maxretry*

Specifies the number of failed password logins permitted before a user is locked out. Values range from 0 through 16 attempted logins. The default value is 0.

### min-length *minlen*

Specifies the minimum length of the password. Valid values range from 8 through 32 characters. The default is 8 characters.

### max-lockout-duration *duration*

Specifies the maximum number of minutes after which the user account is unlocked. Range is from 0 through 99999. The default is 0, representing an infinite duration.

## Modes

Global configuration mode

## Usage Guidelines

To reset password attributes to their default values, enter the **no** form of this command.

## Examples

The following example configures global password attributes and verifies the configuration.

```
device#configure terminal
device(config)# password-attributes max-retry 4
device(config)# password-attributes character-restriction lower 2
device(config)# password-attributes character-restriction upper 1 numeric 1 special-char 1
device(config)# exit
device# show running-config password-attributes

password-attributes max-retry 4
password-attributes character-restriction upper 1
password-attributes character-restriction lower 2
password-attributes character-restriction numeric 1
password-attributes character-restriction special-char 1
```

The following example resets the character restriction attributes and verifies the configuration.

```
device#configure terminal
device(config)# no password-attributes character-restriction lower
device(config)# no password-attributes character-restriction upper
device(config)# exit
device# show running-config password-attributes

password-attributes max-retry 4
password-attributes character-restriction numeric 1
password-attributes character-restriction special-char 1
```

The following example clears all global password attributes.

```
device#configure terminal
device(config)# no password-attributes
device(config)# exit
device# show running-config password-attributes

% No entries found.
```

The following example sets the maximum number of retries to 3 and enables lockout policy for admin role accounts.

```
device#configure terminal
device(config)# password-attributes max-retry 3 admin-lockout
```

The following example specifies that the user account be unlocked after 5 minutes and enables lockout policy for admin role accounts.

```
device#configure terminal
device(config)# password-attributes max-lockout-duration 5 admin-lockout
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# path

A path is a list of router hops that specifies a route across an MPLS domain. Once the user creates a path, the user can create signaled LSPs that see the path.

## Syntax

```
path { path_name } [ hop ip_addr ] | [ [ insert ip_addr ] [ [ loose | strict ] ip_addr ] ]
no path { path_name } [ hop ip_addr ] | [ [ insert ip_addr ] [ [ loose | strict ] ip_addr ] ]
```

## Command Default

No paths are modified by default.

## Parameters

*path\_name*

Specifies the selected path name.

hop *ip\_addr*

Configures the specified the strict or loose hop.

insert *ip\_addr*

Specifies the inserted path strict or loose hop.

loose *ip\_addr*

There can be other routers in between.

strict *ip\_addr*

The router must be directly connected to the preceding node.

## Modes

MPLS path mode (config-router-mpls-path-name).

## Usage Guidelines

The no form of the command removes the specified path.

A path is always configured at the ingress LER and assumes that the ingress LER is the beginning of the path. A path can contain any number of nodes, which correspond to MPLS-enabled routers in the network.

## Examples

The following example configures a path called sf\_to\_sj that has four nodes.

```
device# configure
device(config)# router mpls
device(config-router-mpls)# path sf_to_sj
device(config-router-mpls-path-sf_to_sj)# hop 2.3.4.5 strict
device(config-router-mpls-path-sf_to_sj)# hop 1.2.3.4 strict
device(config-router-mpls-path-sf_to_sj)# exit
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# pdu-rate

Configures pdu-rate value, which is the number of OAMPDUs per second.

## Syntax

**pdu-rate** *rate*

## Command Default

The default value is 1.

## Parameters

*rate*

Specifies the pdu rate per second.

## Modes

Link OAM configuration mode

## Usage Guidelines

The range is from 1 through 10. Configure the timeout interval at least three times the pdu interval to avoid Link OAM protocol flaps against loss of one or two PDUs for any latency issues in general and during HA fail over.

## Examples

```
(config-link-oam) #pdu-rate 10
```

## History

Release version	Command history
17r.1.00	This command was introduced.

## peer

Configures a peer IP address in a bridge domain. A corresponding pseudowire (PW) interface is created when the peer IP address is configured.

## Syntax

```
peer ip-address [ cos num ] [ load-balance ] [ lsplsp-name1, lsp-name2,...lsp-name32 ]
```

```
no peer [ ip-address ]
```

## Command Default

No PW interfaces are configured.

## Parameters

*ip-address*

Specifies a PW IP address for a remote peer.

**cos** *num*

Specifies a Class of Service (CoS) value for selecting a label-switched path to reach the peer. The range is from 0 through 7.

**load-balance**

Specifies load balancing. Up to 16 alternate paths are used for load balancing.

**lsp** *lsp-name1, lsp-name2,...lsp-name32*

Specifies the name of a label-switched path. Up to 32 label-switched path names can be configured.

## Modes

Bridge-domain configuration mode.

## Usage Guidelines

The virtual connection identifier (VC ID) must be configured by using the **vc-id** command prior to configuring the peer IP address to create a PW interface.

The **no** form of the command deletes the peer IP address configuration and the PW interface that corresponds with the specified peer IP address.

The following configuration combinations are allowed:

- **peer** *ip-address* **cos**
- **peer** *ip-address* **cos** **load-balance**
- **peer** *ip-address* **load-balance**
- **peer** *ip-address* **load-balance** **cos**
- **peer** *ip-address* **load-balance** **lsp** *lsp-name1, lsp-name2,...lsp-name32*
- **no peer** *ip-address*



- **no peer ip-address lsp** *lsp-name1, lsp-name2,...lsp-name32*

#### NOTE

When a peer is already configured, you cannot add a CoS or load balance configuration. To configure a CoS value or load balancing, the peer must be removed by using the **no peer** command and re-configured specifying the required **cos** or **load-balance** options.

To remove the CoS or load-balance configuration, the peer configuration must be removed by using the **no peer** command.

## Examples

The following example shows how to configure a peer IP address (10.12.12.12) for bridge domain 1 with the **load-balance** option.

```
device# configure terminal
device(config)# bridge-domain 1
device(config-bridge-domain-1)# peer 10.12.12.12 load-balance
```

The following example shows how to configure a peer IP address (10.12.12.12) for bridge domain 1 specifying two label-switched paths (lsp1 and lsp2).

```
device# configure terminal
device(config)# bridge-domain 1
device(config-bridge-domain-1)# peer 10.12.12.12 lsp lsp1 lsp2
```

The following example shows how to configure a peer IP address (10.1.1.1) for bridge domain 1 specifying load balancing and four label-switched paths (lsp1, lsp2, lsp3 and lsp4).

```
device# configure terminal
device(config)# bridge-domain 1
device(config-bridge-domain-1)# peer 10.1.1.1 load-balance lsp lsp1 lsp2 lsp3 lsp4
```

The following example shows the error message that displays when you try to configure the **load-balance** option for an existing peer. The peer configuration must be removed and reconfigured to specify the **load-balance** option as shown in the example.

```
device# configure terminal
device(config)# bridge-domain 1
device(config-bridge-domain-1)# peer 15.15.15.15
device(config-bridge-domain-1)# peer 15.15.15.15 load-balance
Error: can not configure load-balance on existing peer.
device(config-bridge-domain-1)#no peer 15.15.15.15
device(config-bridge-domain-1)# peer 15.15.15.15 load-balance
```

## History

Release version	Command history
16r.1.00	This command was introduced.

## peer (MCT)

Configures the IP address for the MCT cluster peer.

### Syntax

**peer** *ip-address*

**no peer** [ *ip-address* ]

### Parameters

*ip-address*

Specifies the IP address for the cluster peer. The address is either the peer loopback address or nexthop IP address.

### Modes

Cluster configuration mode.

### Usage Guidelines

Configure a corresponding neighbor in BGP EVPN address family for the peer. If the peer is already configured as a neighbor, when you deploy and undeploy the cluster, the BGP neighbor resets to renegotiate its capability.

If the peer already exists for other address family, clear the IP BGP peer session.

The **no** form of the command deletes the peer IP address configuration.

### Examples

The following example shows the configuring of the cluster peer IP address.

```
device(config)# cluster MCT1 1
device(config-cluster-1)# peer 10.10.10.12
```

### History

Release version	Command history
16r.1.01	This command was introduced.

# peer-interface

Configures the Ethernet or VE interface to reach the MCT cluster peer.

## Syntax

```
peer-interface Ethernet slot/port | Ve number
no peer-interface
```

## Parameters

**Ethernet** *slot/port*  
Specifies the Ethernet interface for the cluster peer.

**Ve** *number*  
Specifies the VE interface for the cluster peer.

## Modes

Cluster configuration mode.

## Usage Guidelines

The **no** form of the command deletes the peer interface configuration.

You must configure the peer interface before deploying the cluster configuration.

You cannot change the peer interface when the cluster is deployed.

## Examples

The following example shows the configuring of the cluster peer interface.

```
device(config)# cluster MCT1 1
device(config-cluster-1)# peer-interface Ve 20
```

## History

Release version	Command history
16r.1.01	This command was introduced.

# penalty

Sets the penalty value for a CSPF fate-sharing group.

## Syntax

```
penalty { penalty_value }
no penalty
```

## Command Default

The command is disabled by default.

## Parameters

*penalty\_value*

Specifies the penalty value that is assigned to objects of the same fate-sharing group. The range is from 1 through 65535. The default value is one (1). Objects of the same fate-sharing group share the same penalty value. For example, all objects in group 3 share the same penalty value of 100.

## Modes

MPLS CSPF group mode.

## Usage Guidelines

The **no** form of the command disables the command..

## Examples

The following example configures the penalty value to 100.

```
device# configure
device(config)# router mpls
device(config-router-mpls)# cspf-group group3
device(config-router-mpls-cspf-group-group3)# penalty 100
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# permit ip host

Creates a rule in an Address Resolution Protocol (ARP) ACL that permits ARP messages from a host specified by both IP and MAC addresses.

## Syntax

```
permit ip host sender-ip mac host sender-mac-address  
no permit ip host sender-ip mac host sender-mac-address
```

## Command Default

No permit rules are defined.

## Parameters

*sender-ip*

Specifies the sender IP address.

**mac host** *sender-mac-address*

Specifies the sender MAC address, in hexadecimal format.

## Modes

ARP ACL configuration mode

## Usage Guidelines

On untrusted interfaces of DAI-enabled VLANs, incoming ARP packets from permitted IP/MAC addresses are accepted only if all of the following steps were performed:

- Create the ACL, using the **arp access-list** command.
- In the ACL, create one or more rules, using the **permit ip host** command. Each rule specifies an IP/MAC address-pair.
- Apply the ACL to one or more VLANs, using the **ip arp inspection filter** command.
- Enable DAI on such VLANs, using the **ip arp inspection** command.

This command is also used to implement ARP Guard.

The **no** form of the command removes the permit rule from the ACL.

## Examples

The following example defines a **permit ip host** rule in an ARP ACL, applies the ACL to a VLAN, and enables DAI on that VLAN.

```
device# configure terminal
device(config)# arp access-list arp_acl_1
device(config-arp-acl)# permit ip host 1.1.1.1 mac host 0020.2222.2222
device(config-arp-acl)# permit ip host 1.1.1.2 mac host 0020.2222.2223
device(config-arp-acl)# exit

device(config)# vlan 200
device(config-vlan-200)# ip arp inspection filter arp_acl_1
device(conf-vlan-200)# ip arp inspection
```

The following example creates a **permit ip host** rule within the **arp access-list** command.

```
device# configure terminal
device(config)# arp access-list host2 permit ip host 1.1.1.1 mac host 0000.0011.0022
```

The following example creates an ARP ACL, creates **permit ip host** rules within, and applies it to an interface. This is the first stage of ARP Guard implementation.

```
device# configure terminal
device(config)# arp access-list arp_acl_2
device(config-arp-acl)# permit ip host 1.1.1.1 mac host 0020.2222.2222
device(config-arp-acl)# permit ip host 1.1.1.2 mac host 0020.2222.2223
device(config-arp-acl)# exit

device(config)# interface ethernet 1/2
device(conf-if-eth-1/2)# switchport
device(conf-if-eth-1/2)# ip arp inspection filter arp_acl_2
```

### NOTE

At this point, ARP Guard is not yet enabled. For enablement details, refer to the "ARP Guard" section of the *Extreme SLX-OS Layer 3 Routing Configuration Guide for SLX 9540 and SLX 9850*.

## History

Release version	Command history
17r.1.00	This command was introduced.

# police cir

Configures the committed information rate, committed burst size, exceeded information rate, and the exceeded burst size for the class map.

## Syntax

```
police cir cir-bps [ cbs bytes ] [ eir bps [ ebs bytes ] ]
```

```
no police cir [ cbs ] [ eir [ ebs ] ]
```

## Parameters

*cir-bps*

Specifies the committed information rate in bits per second. Enter an integer from 0 to 300000000000.

*cbs bytes*

Specifies the committed burst size in bytes. Enter an integer from 1250 to 37500000000.

*eir bps*

Specifies the exceeded information rate in bits per second. Enter an integer from 0 to 300000000000.

*ebs bytes*

Specifies the exceeded burst size in bytes. Enter an integer from 1250 to 37500000000.

## Modes

Policy-map class configuration mode

## Usage Guidelines

Use the **no** version of this command to remove the parameter from the class map.

You can enter CIR and EIR values from 0 to 300000000000, but the operational values are from 22000 to 300000000000.

Only the **police cir** command is mandatory for configuring a class map.

If the optional parameters for a class map are not set, they are treated as disabled. To delete all parameters for a class-map, use the **no police** command.

If CBS and EBS values are not configured, then these values are derived from the CIR and EIR values, respectively. The burst size calculation is as follows: Burst size (CBS or EBS) = 1.2\*information rate (CIR/EIR)/8.

If the configured CBS value is less than 2\*(default MTU) value, then 2\*(default MTU) is programmed as the CBS in the hardware. For example, if you configure CBS at 2000 bytes and the default MTU on an interface is 1548 bytes, when a policy map is applied on this interface, the CBS programmed in the hardware is 2\*MTU (3096 bytes). If you update the MTU value, the CBS value is not be updated.

If the optional EIR or EBS value is not configured, it is disabled and Always Violated traffic is dropped.

To disable the learning of MAC addresses for stream matching of the ACL-based rate limiting entries, the CIR and EIR values must be 0.

The MAC address entries in the MAC-address table which are already learned will not be flushed when you configure the CIR or EIR value as 0. You must explicitly clear the entries in MAC-address table by using the **clear mac-address-table dynamic** command.

## Examples

The following example sets the committed information rate (cir), committed burst size (cbs), exceeded information rate (eir), and the exceeded burst size (ebs).

```
device# configure terminal
device(config)# policy-map policy_2
device(config-policymap)# class default
device(config-policymap-class)# police cir 3000000 cbs 375000000 eir 300000000 ebs 37500000
```

## History

Release version	Command history
16r.1.00	This command was introduced.
17r.1.00	The minimum CIR and EIR values changed from 18000 to 22000. Added CBS and EBS value information in the Usage Guidelines. Updated the CBS information in the Usage Guidelines.
17r.1.01	Changed the minimum CIR and EIR values to 0. However, their minimum operational values are 22000.
17r.1.01a	Added Usage Guideline for disabling the learning of MAC addresses for stream matching of the ACL-based rate limiting entries.



# policy-map

Configures a policy map containing a class map so that you can apply policer and QoS attributes to a particular interface.

## Syntax

```
policy-map policy-mapname
no policy-map policy-mapname
```

## Command Default

No policy map is created.

## Parameters

*policy-mapname*  
Name of police policy map

## Modes

Global configuration mode

## Usage Guidelines

When you launch the **policy-map** command, the system is placed in `config-policymap mode` for the configured map. At this point, you can add a class map containing policing parameters to the policy map. (Refer to the description of the **class** command.)

This command creates a policer policy map to apply policer and QoS attributes to a particular interface. Each policy map can contain up to 32 class maps. The class map can be associated with specific policing and QoS parameters.

Maximum number of policy map creations are 128

Associate the policy map to the interface for inbound or outbound direction with the **service-policy** command.

Enter **no policy-map** *policy-mapname* while in global configuration mode to remove the policy map.

## Examples

Create a policy map and place system into `config-policymap mode` so that you can add a class map.

```
device# configure terminal
device(config)# policy-map policymap1
device(config-policymap)#
```

Remove the policy map while in global configuration mode.

```
device# configure terminal
device(config)# no policy-map policymap1
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# port-channel path-cost

Sets the port channel path cost behavior.

## Syntax

```
port-channel path-cost [ custom | standard ]
```

## Command Default

Path cost is standard.

## Parameters

### custom

Specifies to use the custom behavior, which sets the path cost changes according to the port-channel's bandwidth.

### standard

Specifies to use the standard behavior, which sets that the path cost does not change according to port-channel's bandwidth.

## Modes

Spanning tree configuration mode

## Examples

To set the behavior for the path cost to custom:

```
device# configure terminal
device(config)# protocol spanning-tree stp
device(conf-stp)# port-channel path-cost custom
```

```
device# configure terminal
device(config)# protocol spanning-tree rstp
device(conf-rstp)# port-channel path-cost custom
```

```
device# configure terminal
device(config)# protocol spanning-tree mstp
device(conf-mstp)# port-channel path-cost custom
```

```
device# configure terminal
device(config)# protocol spanning-tree pvst
device(conf-pvst)# port-channel path-cost custom
```

```
device# configure terminal
device(config)# protocol spanning-tree rpvt
device(conf-rpvst)# port-channel path-cost custom
```

To set the behavior for the path cost to standard:

```
device# configure terminal
device(config)# protocol spanning-tree stp
device(conf-stp)# port-channel path-cost standard
```

```
device# configure terminal
device(config)# protocol spanning-tree rstp
device(conf-rstp)# port-channel path-cost standard
```

```
device# configure terminal
device(config)# protocol spanning-tree mstp
device(conf-mstp)# port-channel path-cost standard
```

```
device# configure terminal
device(config)# protocol spanning-tree pvst
device(conf-pvst)# port-channel path-cost standard
```

```
device# configure terminal
device(config)# protocol spanning-tree rpvt
device(conf-rpvt)# port-channel path-cost standard
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# port-group

Accesses the port group mode for the port group of an SLX 9850 36x100G line card that you want to configure.

## Syntax

```
port-group slot/port-group
```

## Parameters

*slot/port-group*

Specified the slot and port group that you want to configure. To display the port groups, use the **show hardware port-group** command.

## Modes

Hardware configuration mode

## Usage Guidelines

Before changing the configuration of a port group, you must power off the line card.

## Examples

The following example accesses a port group.

```
device# configure terminal
device(config)# hardware
device(config-hardware)# port-group 3/1
device(config-port-group-3/1)#
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# power-off

Powers off a line card or switch fabric module (SFM) or power supply unit (PSU).

## Syntax

```
power-off { linecard slot_number } | { sfm slot_number } | { psu psu_number }
```

## Parameters

### line card slot\_number

Powers off the specified line card. For the SLX 9850-4 line card slot number, enter an integer from 1 to 4. For the SLX 9850-8 line card slot, enter an integer from 1 to 8.

### sfm slot\_number

Powers off the specified SFM. For the SFM slot number, enter an integer from 1 to 6.

### psu psu\_number

Powers off the specified power supply unit (PSU) . For the SLX 9850-4 PSU number, enter an integer from 1 to 6. For the SLX 9850-8 PSU number, enter an integer from 1 to 12.

## Modes

Privileged EXEC mode

## Usage Guidelines

A line card must be powered off before you can change the slot configuration.

## Examples

The following example powers off the line card in slot 3.

```
device# power-off linecard 3
```

The following example powers off the power supply unit 1.

```
device# power-off psu 1
```

### NOTE

The following error will be displayed if the specified power supply unit 1 does not exist:

```
device# power-off psu 1
Unable to power-off psu 1
```

## History

Release version	Command history
16r.1.00	This command was introduced.

Release version	Command history
17r.1.00	New parameter added for powering off a power supply unit for SLX 9850-4 and SLX 9850-8 device chassis.

## power-on

Powers on a line card or switch fabric module (SFM) or power supply unit (PSU).

### Syntax

```
power-on { linecard slot_number } | { sfm slot_number } | { psu psu_number }
```

### Parameters

#### line card slot\_number

Powers on the specified line card. For the SLX 9850-4 line-card slot number, enter an integer from 1 to 4. For the SLX 9850-8 line-card slot, enter an integer from 1 to 8.

#### sfm slot\_number

Powers on the specified SFM. For the SFM slot number, enter an integer from 1 to 6.

#### psu psu\_number

Powers on the specified power supply unit on the system if it has been previously powered off by the CLI. For the SLX 9850-4 psu number, enter an integer from 1 to 6. For the SLX 9850-8 psu number, enter an integer from 1 to 12.

#### NOTE

If there is no input power to the PSU when executing the power-on command, it will fail.

### Modes

Privileged EXEC mode

### Examples

The following example powers on the line card in slot 3.

```
device# power-on linecard 3
```

The following example powers on the power supply unit 1.

```
device# power-on psu 1
```

#### NOTE

The following error will be displayed if the specified power supply unit 1 does not exist:

```
device# power-on psu 1
Unable to power-on psu 1
```

### History

Release version	Command history
16r.1.00	This command was introduced.
17r.1.00	New parameter added for powering on a power supply unit for SLX 9850-4 and SLX 9850-8 device chassis.



# preempt-mode

Enables or disables preempt mode for a VRRP or VRRP Extended (VRRP-E) router session.

## Syntax

```
preempt-mode
no preempt-mode
```

## Command Default

Enabled for VRRP; Disabled for VRRP-E.

## Modes

Virtual-router-group configuration mode  
Virtual-router-extended-group configuration mode

## Usage Guidelines

This command is for VRRP and VRRP-E.

For VRRP-E, the interface must be a virtual interface (Ve).

When set, the highest-priority backup router will always be the master if the owner is not available. If not set, a higher priority backup will not preempt a lower-priority master.

Enter **no preempt-mode** to turn off preempt mode.

## Examples

To turn on preempt mode for a virtual-router-group 1 session:

```
device# configure terminal
device(config)# ipv6 protocol vrrp-extended
device(config)# interface ve 10
device(config-if-Ve-10)# ipv6 vrrp-extended-group 1
device(config-vrrp-extended-group-1)# preempt-mode
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# primary-path

The user can configure an explicit path for the bypass LSP or dynamic bypass LSP using the **primary-path** command.

## Syntax

```
primary-path { path_name }
no primary-path { path_name }
```

## Command Default

By default, there is no configuration of the primary path.

## Parameters

*path\_name*  
Specifies the name of the configured path in the MPLS router.

## Modes

MPLS router bypass LSP configuration mode (config-router-mpls-bypass-lsp-*bypass\_name*).

MPLS router MPLS interface dynamic bypass configuration mode (config-router-mpls-if-ethernet-*slot/port*-dynamic-bypass)

## Usage Guidelines

The path must be already defined in MPLS router.

The user can configure an explicit path for dynamic bypass LSPs that are created for a protected interface.

The **no** form of this command removes the path from the bypass LSP and considers the primary path as not configured.

## Examples

The following example defines *dbyp-path* as the primary path.

```
device>configure
device(config)# router mpls
device(config-router-mpls)# bypass-lsp dbyp-path
device(config-router-mpls-bypass-lsp-dbyp-path)#
```

The following example defines *dbyp-path* as the primary path for dynamic bypass MPLS ethernet interface *2/8*.

```
device>configure
device(config)# router mpls
device(config-router-mpls)# mpls-interface ethernet 2/8
device(config-router-mpls-if-ethernet-2/8)# dynamic-bypass
device(config-router-mpls-if-ethernet-2/8-dynamic-bypass)# primary-path dbyp-path
```

# History

Release version	Command history
17r.1.00	This command was introduced.

# priority

Sets the priority of a physical router in a VRRP router group.

## Syntax

**priority** *range*

## Command Default

The default priority is 100.

## Parameters

*range*

The priority of a physical router in a virtual router group. Higher numbers have priority over lower numbers. Valid values range from 1 to 254.

## Modes

Virtual-router-group configuration mode

Virtual-router-extended-group configuration mode

## Usage Guidelines

You can perform this command for VRRP or VRRP-E.

When set, the highest priority backup router will always be the master. (For VRRP, however, the owner is always the master if it is available.) If not set, a higher priority backup will not preempt a lower priority backup that is acting as master.

For an owner router in VRRP, the priority automatically becomes 255 if the virtual IP address of the virtual router and the real IP address of the owner are the same.

## Examples

To set the priority to 110 for the VRRP virtual group 1:

```
device# configure terminal
device(config)# protocol vrrp
device(config)# interface ve 10
device(config-if-Ve-10)# vrrp-group 1
device(config-vrrp-group-1)# priority 110
```

To set the priority to 110 for the VRRP-E virtual group 1:

```
device# configure terminal
device(config)# ipv6 protocol vrrp-extended
device(config)# interface ve 10
device(config-if-Ve-10)# ipv6 vrrp-extended-group 1
device(config-vrrp-extended-group-1)# priority 110
```

# History

Release version	Command history
16r.1.00	This command was introduced.

# process-restart

Enables the process restart capability for BGP, IS-IS, MPLS, OSPFv2 and OSPFv3.

## Syntax

```
process-restart { bgp | isis | mpls | ospfv2 | ospfv3 }
```

```
no process-restart { bgp | isis | mpls | ospfv2 | ospfv3 }
```

## Command Default

The process restart capability for BGP, ISIS, OSPFv2, and OSPFv3 is disabled. The process restart capability for MPLS is enabled.

## Parameters

<b>bgp</b>	Specifies the BGP protocol.
<b>isis</b>	Specifies the ISIS protocol.
<b>mpls</b>	Specifies the MPLS protocol.
<b>ospfv2</b>	Specifies the OSPFv2 protocol.
<b>ospfv3</b>	Specifies the OSPFv3 protocol.

## Modes

HA configuration mode (config-ha).

## Usage Guidelines

### NOTE

The process restart capability should not be enabled when BGP EVPN is configured. For more information on BGP EVPN refer to the *Extreme SLX-OS Layer 3 Routing Configuration Guide*.

The process restart capability for BGP, IS-IS, MPLS, OSPFv2 and OSPFv3 is a fault containment mechanism that ensures that process-level failures do not cause system-level failures.

All these processes are COLD restartable processes, meaning when there is a fault inside one of these processes, and it crashes, the system does not undergo a failover; instead, the process is restarted on the same ACTIVE MM. All the other modules and processes that interact with this particular process are made aware of the process restart, and they adjust accordingly.

In the case of MPLS, all the MPLS-based services, such as IPoMPLS, VLL, VPLS are disrupted for the duration of MPLS process restart. Once the MPLS process is restarted, the control protocols (LDP and RSVP) re-signal the tunnels and cross-connects and subsequently all the dependent MPLS applications to resume service. In the case of routing protocols like BGP, ISIS and OSPF, all the existing adjacencies will be brought down, and will be re-established once the process comes up again. Some traffic loss may be expected until the adjacency comes up again.

If more than one process restart happens within a minute, the entire board reboots, resulting in a failover in the case of dual MM routers or router reload in the case of single MM and pizza box routers.

The benefits of process restartability of the routing protocol processes can be seen in the following cases:

- The unplanned outage of the routing protocol process can be handled without impacting the whole system or other dependent services.
- Any exception or crash related to the routing protocol process does not lead to an MM switchover that further leads to network churn.
- The system returns to a stable state quicker than if nonstop-routing (NSR) or graceful restart (GR) is configured on the device.
- Process restart is highly beneficial in the case of routers where a standby master board is not available (for example, single MM routers or pizza boxes like Avalanche), where a crash in these processes would otherwise have resulted in a router reload.

## Examples

The following example disables the process-restart capability for MPLS.

```
device# configure terminal
device(config)# ha
device(config-ha)# no process-restart mpls
```

The following example enables the process-restart capability for BGP.

```
device# configure terminal
device(config)# ha
device(config-ha)# process-restart bgp
```

The following example enables the process-restart capability for IS-IS.

```
device# configure terminal
device(config)# ha
device(config-ha)# process-restart isis
```

The following example enables the process-restart capability for OSPFv2.

```
device# configure terminal
device(config)# ha
device(config-ha)# process-restart ospfv2
```

The following example disables the process-restart capability for OSPFv3.

```
device# configure terminal
device(config)# ha
device(config-ha)# no process-restart ospfv3
```

## History

Release version	Command history
16r.1.00	This command was introduced.

Release version	Command history
17r.1.00	Support was added for BGP, IS-IS, OSPFv2 and OSPFv3.



# profile (hardware)

Use the **profile** command to view the profiles.

## Syntax

```
profile { counters | LAG|TCAM }
```

## Command Default

Displays the profiles.

## Parameters

### counters

Selects counter profile.

### LAG

Selects LAG profile.

### TCAM

Selects TCAM profile type.

## Modes

Hardware configuration mode.

## Examples

The following displays profiles:

```
device# configure terminal
device(config)# hardware
device(config-hardware)# profile
```

## History

Release version	Command history
17r.1.01	This command was introduced.

# profile (LLDP)

Creates an LLDP profile.

## Syntax

**profile** *name*

**no profile** *name*

## Parameters

*name*

Assigns a name to the profile. The name must be between 1 and 63 ASCII characters in length.

*name*

Assigns a name to the profile. The name must be between 1 and 32 ASCII characters in length.

## Modes

Protocol LLDP configuration mode

## Usage Guidelines

When you apply an LLDP profile on an interface using the **lldp profile** command, it overrides the global configuration. If a profile is not present, then the default global profile is used until you create a valid profile. Up to 64 profiles can be created.

Enter **no profile** *name* to remove the named profile.

## Examples

The following example creates a profile named test.

```
device# configure terminal
device(config)# protocol lldp
device(conf-lldp)# profile test
```

The following example creates a profile named test1.

```
device(config)# protocol lldp
device(conf-lldp)# profile ?
Possible completions:
<Profile Name (Max Size - 32)>
device(conf-lldp)# profile test1
device(config-profile-test1)#
```

The following example deletes a profile named test:

```
device# configure terminal
device(config)# protocol lldp
device(conf-lldp)# no profile test
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# profile (Telemetry)

Designates the profile to be used for the Telemetry collector.

## Syntax

**profile** { *telemetry\_profile\_name*}

**no profile** {*profile\_type* *telemetry\_profile\_name*}

## Command Default

No profile is designated.

## Parameters

*telemetry\_profile\_name*

The type of profile for the telemetry configuration. The available profile names are **system-utilization** and **interface**.

## Modes

Telemetry collector configuration mode.

## Usage Guidelines

The no version of the command removes the profile details from collector.

## Examples

Typical command execution example.

```
device# configure terminal
device(config)# telemetry collector collector_1
device(config-telemetry-collector)# profile system-utilization
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# profile counters

To optimize counters, enter **profile counters** command in configuration hardware mode.

## Syntax

```
profile counters { counter-profile- | counter-profile-2 | counter-profile-3 | counter-profile-4 | default }
```

## Command Default

The default counter profile is configured.

## Parameters

### counter-profile-1

Bridge Domain optimized with Fwd/Drop counting in ingress L4.

### counter-profile-2

Bridge Domain optimized with hit counting in ingress L4.

### counter-profile-3

L2 optimized, hit counting in ingress L4.

### counter-profile-4

L4/NPB optimized, fwd/drop counting for all ingress L4.

### default

Ingress and Egress L4.

## Modes

Hardware configuration mode

## Examples

The following example optimizes Bridge Domain hit counting for Layer 4 ingress traffic.

```
device# configure terminal
device(config)# hardware
device(config-hardware)# profile counters counter-profile-2
```

## History

Release version	Command history
17r.1.01	This command was introduced.

# profile route-table

Optimizes hardware forwarding resources for route tables.

## Syntax

```
profile route-table { default | ipv4-max-arp | ipv6-max-nd | multicast | multicast-snoop | user-defined } [ maximum_paths
{ 8 | 16 | 32 | 64 } ]
```

## Command Default

The default hardware profiles are enabled.

## Parameters

### default

Optimizes IPv4/IPv6 resources for dual-stack operations.

### ipv4-max-arp

Optimizes resources for IPv4 unicast with maximum ARP.

### ipv6-max-nd

Optimizes resources for IP unicast and IPV6 routing with maximum ND.

### multicast

Optimizes resources for IP unicast dual stack and IPv4 mulitcast.

### multicast-snoop

Optimizes resources for IP unicast dual stack and multicast snooping.

### user-defined

Optimizes resources for the user-defined profile.

### maximum\_paths

Specifies 8, 16, 32, or 64 as the maximum number of load-sharing paths.

## Modes

Hardware configuration mode

## Usage Guidelines

### ATTENTION

This is a disruptive command. In order for the last update of the profile configuration to take effect on a device, you must run the **copy running-config startup-config** command followed by the **reload system** command.

This configuration command configures the route-table hardware forwarding resource allocation to optimize the specified protocol functionality.

The maximum-path variable is optional. If skipped, the maximum-path remains unchanged. This parameter is not supported for the user-defined subtype.

There is not a **no** form of this command.

The detailed layout of user-defined profile is not configured through the CLI interface. Instead, you must lay out the profile details in an .xml file that will be pre-loaded onto the switch to a pre-defined location and consumed by platform/ASIC modules as the device boots up.

The device boots up in pre-defined default hardware profile and with no user-defined profile. The default version of user-defined profile that comes with the release package is present on the device. Follow the suggested procedure to create and deploy user-defined profile. You can use it as a template to compile your own based on your needs.

Use the **copy user-defined-profile file-url** command to upload your version of the user-defined profile to the device. The default user-defined profile that comes with the release package is always available.

The locations for user-defined profile and the default template from the release package are:

- /var/config/profile/user-defined
- /var/config/profile/default-profile

As the device boots up, if the hardware profile is specified to be user-defined, then the software loads the profile from this location to initialize ASIC resource allocation.

## Examples

To optimize route profiles with a maximum of 16 paths for IIPv4 unicast with maximum ARP:

```
device# configure terminal
device(config)# hardware
device(config-hardware)# profile route-table ipv4-max-arp maximum_paths 16
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# profile tcam

Optimizes hardware resources for ternary content-addressable memory (TCAM) profiles.

## Syntax

```
profile tcam { default | layer2-optimised-1 | npb-optimised-1 | openflow-optimised-1 | openflow-optimised-2 | openflow-optimised-3 | vxlan-ext }
```

## Command Default

The default TCAM profile is enabled.

## Parameters

### default

Optimizes resources with basic support for all applications.

### layer2-optimised-1

Optimizes resources for Layer 2 applications and VPLS endpoints.

### npb-optimised-1

Optimizes resources for the Network Packet Broker (NPB) application.

### openflow-optimised-1

Optimizes resources for Openflow IPv4 Layer 2, 3 and 23.

### openflow-optimised-2

Optimizes resources for Openflow IPv4 Layer 2, 3 and 2 with metered action.

### openflow-optimised-3

Optimizes resources for Openflow IPv4 Layer 2, 3 and 2, and IPv6 Layer 3, with metered action.

### vxlan-ext

Optimizes resources for Vxlan transit and termination, and GRE tunnel.

## Modes

Hardware configuration mode

## Usage Guidelines

### ATTENTION

This is a disruptive command. In order for the last update of the profile configuration to take effect on a device, the device has to be rebooted by means of the **reload system** command.

There is not a **no** form of this command.



## Examples

The following example optimizes TCAM resources for Layer 2 applications and VPLS endpoint:

```
device# configure terminal
device(config)# hardware
device(config-hardware)# profile tcam layer2-optimised-1
```

## History

Release version	Command history
16r.1.00	This command was introduced.
17r.1.01	Added the <b>layer2-optimised-1</b> keyword.

# protocol

Configures the authentication protocol to use for communication with the Remote Authentication Dial-In User Service (RADIUS) server.

## Syntax

```
protocol { chap | pap | peap }
no protocol
```

## Command Default

The default protocol is Challenge Handshake Authentication Protocol (CHAP).

## Parameters

- chap**  
Specifies using CHAP for communication with the RADIUS server.
- pap**  
Specifies using Password Authentication Protocol (PAP) for communication with the RADIUS server.
- peap**  
Specifies using Protected Extensible Authentication Protocol (PEAP) for communication with the RADIUS server.

## Modes

RADIUS server host VRF configuration mode

## Usage Guidelines

The **no** form of the command restores the command default value.

## Examples

The following example shows how to configure PAP as the authentication protocol for communication with the RADIUS server.

```
device# configure terminal
device(config)# radius-server host 10.37.73.180 use-vrf green-vrf
device(config-host-10.37.73.180/green-vrf)# protocol pap
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# protocol cfm

Enables the CFM protocol globally on the devices and enter into the CFM Protocol Configuration mode.

## Syntax

```
protocol cfm
```

```
no protocol cfm
```

## Command Default

This command is executed on the local switch.

## Modes

Privileged EXEC mode

## Usage Guidelines

The **no** form of this command disables the CFM protocol on the device.

## Examples

```
device# (config) protocol cfm
device(config-cfm) #
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# protocol link-oam

Allows you to enter the link OAM global configuration mode.

## Syntax

`protocol link-oam`

## Command Default

This command is executed on the local switch.

## Modes

Privileged EXEC mode

## Examples

```
device# configure terminal
device(config)#protocol link-oam
device(config-link-oam) #
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# protocol lldp

Enters the Link Layer Discovery Protocol (LLDP) configuration mode.

## Syntax

```
protocol lldp
```

```
no protocol lldp
```

## Command Default

LLDP protocols are enabled.

## Modes

Global configuration mode

## Usage Guidelines

Enter **no protocol lldp** to restore the default settings.

## Examples

To enter LLDP mode:

```
device# configure terminal
device(config)# protocol lldp
device(conf-lldp)#
```

To reset all LLDP configurations:

```
device# configure terminal
device(config)# no protocol lldp
device(conf-lldp)#
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# protocol loop-detection

Enables the loop detection (LD) feature globally and enters Protocol Loop Detection configuration mode.

## Syntax

```
protocol loop-detection
```

```
no protocol loop-detection
```

## Command Default

This feature is disabled.

## Modes

Global configuration mode

## Usage Guidelines

Use the **no** form of this command to disable loop detection globally.

## Examples

To enable loop detection globally and enter Protocol Loop Detection configuration mode:

```
device# configure terminal
device(config)# protocol loop-detection
device(config-loop-detect) #
```

To disable loop detection globally:

```
device# configure terminal
device(config)# no protocol loop-detection
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# protocol spanning-tree

Designates the context for spanning tree.

## Syntax

```
protocol spanning-tree { mstp | rstp | stp | pvst | rpvst }  
no protocol spanning-tree
```

## Command Default

STP is not enabled. STP is not required in a loop-free topology.

## Parameters

<b>mstp</b>	Specifies the Multiple Spanning Tree Protocol (MSTP).
<b>rstp</b>	Specifies the Rapid Spanning Tree (RSTP).
<b>stp</b>	Specifies the Spanning Tree Protocol (STP).
<b>pvst</b>	Specifies Per-VLAN Spanning Tree Protocol Plus (PVST+).
<b>rpvst</b>	Specifies Rapid Per-VLAN Spanning Tree Protocol Plus (R-PVST+).

## Modes

Global configuration mode

## Usage Guidelines

Consider enabling STP to detect or avoid loops. You must turn off one form of STP before turning on another form.

Packet drops or packet flooding may occur if you do not enable xSTP on all devices connected on both sides of parallel links.

Enter **no protocol spanning-tree** to delete the context and all the configurations defined within the context or protocol for the interface.

## Examples

To enable the Spanning Tree Protocol:

```
device# configure terminal  
device(config)# protocol spanning-tree stp
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# protocol uddl

Enables and/or enters unidirectional link detection (UDLD) protocol configuration mode.

## Syntax

`protocol uddl`

`no protocol uddl`

## Command Default

This protocol is disabled by default.

## Modes

Global configuration mode

## Usage Guidelines

UDLD detects and blocks a physical link that becomes unidirectional. A unidirectional link can cause traffic in a network to loop endlessly. When the link becomes bidirectional again, UDLD unblocks the link.

This protocol applies only to physical ports. In addition to running this command, you must also enable each desired port for UDLD in interface subconfiguration mode.

Use the **no protocol uddl** command to disable the UDLD protocol and revert all UDLD configuration to defaults.

## Examples

To enable the unidirectional link detection (UDLD) protocol:

```
device# configure terminal
device(config)# protocol uddl
```

# protocol vrrp

Globally enables Virtual Router Redundancy Protocol (VRRP).

## Syntax

```
protocol vrrp
```

```
no protocol vrrp
```

## Command Default

VRRP is not enabled.

## Modes

Global configuration mode

## Usage Guidelines

The **no** form of this command globally disables VRRP.

## Examples

To enable VRRP:

```
device# configure terminal
device(config)# protocol vrrp
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# protocol vrrp-extended

Globally enables VRRP-Extended.

## Syntax

```
protocol vrrp-extended  
no protocol vrrp-extended
```

## Command Default

Disabled

## Modes

Global configuration mode

## Usage Guidelines

The **no protocol vrrp-extended** command globally disables VRRP-E.

## Examples

To enable VRRP-Extended:

```
device# configure terminal  
device (config)# protocol vrrp-extended
```

# prune-wait

Configures the time a PIM device waits before stopping traffic to neighbor devices that do not want the traffic.

## Syntax

`prune-wait seconds`

`no prune-wait`

## Command Default

The prune wait time is 3 seconds.

## Parameters

*seconds*

Specifies the wait time in seconds. The range is 0 through 30 seconds. The default is 3 seconds.

## Modes

PIM router configuration mode

## Usage Guidelines

A smaller prune wait value reduces flooding of unwanted traffic. A prune wait value of 0 causes the PIM device to stop traffic immediately upon receiving a prune message.

If there are two or more neighbors on the physical port, you should not configure the **prune-wait** command because one neighbor may send a prune message while the other sends a join message at the same time, or within less than 3 seconds.

The **no** form of this command restores the default prune wait time of 3 seconds.

## Examples

This example configures the prune wait time to 0 seconds.

```
device(config)# router pim
device(config-pim-router)# prune-wait 0
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# pw-profile

Creates a pseudowire (PW) profile that can be shared across multiple Virtual Private LAN Services (VPLS) bridge domains.

## Syntax

```
pw-profile [pw-profile-name [ mtu mtu-value ] [ mtu-enforce { false | true } ] [ vc-mode { raw | raw-passthrough | tag } ]
no pw-profile pw-profile-name [ mtu ] [ mtu-enforce ] [ vc-mode ] ]
```

## Command Default

No PW profile is configured.

## Parameters

*pw-profile-name*

Specifies the name of a PW profile.

**mtu** *mtu-value*

Specifies the maximum transmission unit (MTU) for the PW profile. The range is from 64 through 15966.

**mtu-enforce**

Configures MTU enforcement check during PW signaling.

*false*

Enables the MTU enforcement check.

*true*

Disables the MTU enforcement check.

**vc-mode**

Configures the virtual connection (VC) mode for the profile:

**raw**

Specifies using raw mode. At VC label imposition, when a tagged packet is received on a tagged AC endpoint, the VLAN tag is removed before it is sent out on the wire. When an untagged packet is received on an untagged AC endpoint it is encapsulated as is and sent out on the wire.

**raw-passthrough**

Specifies using raw-passthrough mode which enables interoperability with third-party devices. When all endpoints are configured as tagged endpoints, raw passthrough mode behaves the same way as tagged mode. When all endpoints are configured as untagged endpoints, raw-passthrough mode behaves the same way as raw mode. Select the **raw-passthrough** option, when all endpoints are configured as untagged endpoints (even when peer devices signal the PW VC mode as raw).

**tag**

Specifies using tag mode. At VC label imposition, when a tagged packet is received on a tagged AC endpoint, the packet is encapsulated as is and sent out on the wire. When an untagged packet is received on an untagged AC endpoint, a dummy tag is added and it is sent out on the wire.

## Modes

Global configuration mode.

## Usage Guidelines

You can configure up to 64 PW profiles.

The **no** form of the command removes the PW profile configuration.

## Examples

The following example shows how to create a PW profile named test specifying that the VC mode for the profile is raw-passthrough.

```
device# configure terminal
device(config)# pw-profile test vc-mode raw-passthrough
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# pw-profile (bridge domain)

Configures a pseudowire (PW) profile for a bridge domain.

## Syntax

```
pw-profile pw-profile-name
no pw-profile
```

## Command Default

A PW profile is not configured.

## Parameters

*pw-profile-name*  
Specifies the name of the PW profile to attach to the bridge profile.

## Modes

Bridge-domain configuration mode.

## Usage Guidelines

The **no** form of the command removes the PW profile from the bridge-domain configuration.

## Examples

The following example shows how to configure a PW profile named test for bridge domain 1.

```
device# configure terminal
device(config)# bridge-domain 1
device(config-bridge-domain-1)# pw-profile test
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# python

Launches an interactive Python shell, with an option to launch a Python script.

## Syntax

```
python [ python-statement | python-script-filename ]
```

## Parameters

*python-statement*

Must be a valid python interpreter argument.

*python-script-filename*

Runs a Python script file. Valid values range from 4 through 32 characters (including the **.py** extension). The first character must be alphabetic.

## Modes

Privileged EXEC mode

## Usage Guidelines

This command is available only to users with admin-level permissions.

Entering **python**—with no additional parameters—launches an interactive Python shell.

Entering **python** *python-statement* launches an interactive Python shell and runs a valid *python-statement* that you enter. For example, entering `python -h` invokes the Python shell and displays Python options and arguments.

Entering **python** *python-script-filename* launches an interactive Python shell and runs the Python file. (To make a Python file available to this command, copy the Python file to the `flash://` location on the device, using the **copy** command.)

Note the following divergence between SLX-OS CLI syntax and Python syntax:

- Although in general, SLX-OS CLI syntax is not case-sensitive, Extreme convention is to use lower-case.
- Python syntax is case sensitive.

To exit the Python environment and return to the CLI, enter either:

- **exit()**
- **Ctrl-D**



## Examples

The following example launches the Python shell and then both assigns an SLX CLI operational command to a Python variable and runs that command.

```
device# python
Python 3.4.3 (default, Apr 11 2014, 13:05:18)
[GCC 4.8.2] on linux
Type "help", "copyright", "credits" or "license" for more information.
>>> cmd_show_users = CLI('show users')
!Command: show users
!Time: Tue Aug 9 09:09:39 2016

**USER SESSIONS**
Username          Role      Host IP      Device  Time Logged In
jdoe              admin    10.11.12.13  Cli     2016-08-09 09:06:46
admin            admin    127.1.0.1    Cli     18640
**LOCKED USERS**
Username
no locked users
>>>
```

The following example (partial) launches the Python shell to run a Python script-file.

#### NOTE

For an annotated text of this script, refer to the *Extreme SLX-OS Management Configuration Guide* > "Python Event-Management and Scripting" > "Python scripts and run-logs."

```

device# python create_po.py
!Command: show running-config vlan
!Time: Mon Aug 22 18:33:03 2016

vlan 1
!
vlan dot1q tag native

!Command: config
vlan 101-105
!Time: Mon Aug 22 18:33:03 2016

!Command: show running-config vlan
!Time: Mon Aug 22 18:33:03 2016

vlan 1
!
vlan 101
!
vlan 102
!
vlan 103
!
vlan 104
!
vlan 105
!
vlan dot1q tag native

!Command: show running-config int po
!Time: Mon Aug 22 18:33:03 2016

interface Port-channel 1
description Insight port-channel on MM1
shutdown
!
interface Port-channel 2
description Insight port-channel on MM2
shutdown
!

!Command: config
int po 10
switchport
switchport mode trunk
switchport trunk allowed vlan add 101-105
switchport trunk tag native-vlan ; no shut
!Time: Mon Aug 22 18:33:03 2016

!Command: show running-config int po
!Time: Mon Aug 22 18:33:04 2016

interface Port-channel 1
description Insight port-channel on MM1
shutdown
!
interface Port-channel 2
description Insight port-channel on MM2
shutdown
!
interface Port-channel 10
switchport
switchport mode trunk

```

```

switchport trunk allowed vlan add 101-105
switchport trunk tag native-vlan
no shutdown
!

!Command: config
int eth 1/40
channel-group 10 mode active type standard
no shut
!Time: Mon Aug 22 18:33:04 2016

!Command: show running-config int eth 1/40
!Time: Mon Aug 22 18:33:04 2016

interface Ethernet 1/40
channel-group 10 mode active type standard
lACP timeout long
no shutdown
!

!Command: config
int eth 1/41
channel-group 10 mode active type standard
no shut
!Time: Mon Aug 22 18:33:04 2016

!Command: show running-config int eth 1/41
!Time: Mon Aug 22 18:33:05 2016

interface Ethernet 1/41
channel-group 10 mode active type standard
lACP timeout long
no shutdown
!

!Command: config
int eth 1/42
channel-group 10 mode active type standard
no shut
!Time: Mon Aug 22 18:33:05 2016

<output truncated>

```

## History

Release version	Command history
16r.1.00	This command was introduced.

# qos cos

Changes the interface default Class of Service (CoS) value.

## Syntax

```
qos cos cos_value
```

## Command Default

The default is 0.

## Parameters

*value*

Specifies the CoS value. Valid values range from 0 through 7.

## Modes

Interface configuration mode

## Examples

To set the CoS value to 2 on a specific Ethernet interface:

```
device# configure terminal
device(config)# interface ethernet 1/3
device(conf-if-fo-1/3)# qos cos 2
```

To set the CoS value to 2 on a specific port channel interface:

```
device# configure terminal
device(config)# interface port-channel 22
device(config-port-channel-22)# qos cos 2
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# qos cos-mutation

Applies a user configured QoS CoS-to-CoS mutation map to an interface.

## Syntax

```
qos cos-mutation cos_map_name
```

## Command Default

No explicit QoS CoS-to-CoS mutation map is applied; the inbound CoS equals the outbound CoS.

## Parameters

*cos\_map\_name*

The name of the CoS mutation map.

## Modes

Interface configuration mode

## Usage Guidelines

Mutation mapping is a method of modifying a QoS field in all packets on an interface. On ingress, mutation mapping occurs before traffic classification and all other actions. On egress, mutation mapping occurs after traffic classification and before all other actions.

## Examples

Follow this example to apply a QoS CoS-to-CoS mutation map to a specific Ethernet interface:

```
device# configure terminal
device(config)# interface ethernet 1/3
device(config-if-eth-1/3)# qos cos-mutation cos_mutation_map
```

To apply a QoS CoS-to-CoS mutation map to a specific port-channel interface:

```
device# configure terminal
device(config)# interface port-channel 22
device(config-port-channel-22)# qos cos-mutation cos_mutation_map
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# qos cos-traffic-class

Applies a Quality of Service (QoS) CoS-to-traffic class mutation map on an interface.

## Syntax

```
qos cos-traffic-class cos_map_name
```

## Command Default

No explicit QoS CoS-to-traffic class mutation map is applied; the inbound CoS equals the outbound CoS.

## Parameters

*cos\_tc\_map\_name*

The name of the CoS-to-traffic class mutation map.

## Modes

Interface configuration mode.

## Usage Guidelines

Mutation mapping is a method of modifying a QoS field in all packets on an interface. On ingress, mutation mapping occurs before traffic classification and all other actions. On egress, mutation mapping occurs after traffic classification and before all other actions.

## Examples

To activate a QoS CoS-to-traffic class mutation map named `cosMutMap` on a specific Ethernet interface:

```
device# configure terminal
device(config)# interface ethernet 1/3
device(config-if-eth-1/3)# qos cos-mutation cosMutMap
```

To activate a QoS CoS-to-traffic class mutation map from a specific port channel interface:

```
device# configure terminal
device(config)# interface port-channel 22
device(config-port-channel-22)# qos cos-mutation cosMutMap
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# qos cpu slot

Use this command to configure the traffic manager (TM) CPU port shaper rate (all towers) to the line card (LC) CPU.

## Syntax

```
qos cpu slot slot_id { group group_id { prio { priority | all } | shaper rate shaper_rate burst burst_size | wfq weight weight_value }
```

```
qos cpu slot slot_id { port shaper rate shaper_rate burst burst_size }
```

```
no qos cpu slot slot_id { group group_id { prio { priority | all } | shaper rate shaper_rate burst burst_size | wfq weight weight_value }
```

```
no qos cpu slot slot_id { port shaper rate shaper_rate burst burst_size }
```

## Command Default

The TM CPU group or port shaper rate is not set.

## Parameters

*slot\_id*

The slot values are 0 on Pizzabox platforms, 1 through 4 on F4 platforms and, 1 through 8 on F8 platforms.

**group** *group\_id*

Configures a CPU group.

**shaper rate** *shaper\_rate*

Configures the TM CPU shaper rate (all towers) to LC CPU for CPU groups. The rate is in kilo bits per second (Kbps) with a range from 0 through 100000.

**prio** *priority*

C onfigures the TM CPU shaper rate (all towers) to line card CPU for individual priority VoQs within a CPU group. The priority value ranges from 0 through 7.

**burst** *burst\_size*

Configures the CPU burst size. he burst size value has a a range from 1 through 64 KB.

**wfq weight** *weight\_value*

Configures the CPU group's weighted fair queue value (all towers). The weight value ranges from 1 through 128. Higher value.

**port**

Configures a CPU port.

## Modes

Global configuration mode.

## Usage Guidelines

The **no** form of the command removes the QoS CPU shaper configuration.

## Examples

Set the TM CPU port shaper on slot 1 to priority 5, rate of 4500 Kbps, and a burst size of 1KB.

```
device# configure terminal
device(config)# qos cpu slot 1 port shaper rate 4000 burst 1
```

Set the TM CPU port shaper on slot 1 to 4000 Kbps w/ a burst size of 1KB.

```
device# configure terminal
device(config)# qos cpu slot 1 port shaper rate 4000 burst 1
```

Set the TM CPU on slot 1 group 1 priority to 5, shaper to 4500 Kbps, and a burst size of 1KB.

```
device# configure terminal
device(config)# qos cpu slot 1 group 1 priority 5 shaper rate 4500 burst 1
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# qos dscp-cos

Applies a user configured QoS DSCP-to-CoS mutation map to an interface.

## Syntax

```
qos dscp-cos dscp_cos_map_name
```

## Command Default

No explicit QoS DSCP-to-CoS mutation map is applied.

## Parameters

*dscp\_cos\_map\_name*  
Name of DSCP-to-COS mutation map

## Modes

Interface configuration mode.

## Usage Guidelines

Mutation mapping is a method of modifying a QoS field in all packets on an interface. On ingress, mutation mapping occurs before traffic classification and all other actions. On egress, mutation mapping occurs after traffic classification and before all other actions.

## Examples

Follow this example to apply a user configured QoS DSCP-to-COS mutation map named `dscpMap` to a specific Ethernet interface.

```
device# configure terminal
device(config)# interface ethernet 2/2
device(config-if-eth-2/2)# qos dscp-cos dscpMap
```

Follow this example to apply a user configured QoS DSCP-to-COS mutation map named `dscpMap` to a specific port channel interface.

```
device# configure terminal
device(config)# interface port-channel 22
device(config-port-channel-22)# qos dscp-cos dscpMap
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# qos dscp-mutation

Applies a user configured QoS DSCP mutation map to an interface.

## Syntax

```
qos dscp-mutation dscp_map_name
```

## Command Default

No explicit user configured QoS DSCP-to-DSCP mutation map is applied; the inbound DSCP equals the outbound DSCP.

## Parameters

*dscp\_map\_name*  
The name of the DSCP mutation map

## Modes

Interface subtype configuration mode

## Usage Guidelines

Mutation mapping is a method of modifying a QoS field in all packets on an interface. On ingress, mutation mapping occurs before traffic classification and all other actions. On egress, mutation mapping occurs after traffic classification and before all other actions.

## Examples

Follow this example to apply a QoS DSCP-to-DSCP mutation map to a specific Ethernet interface:

```
device# configure terminal
device(config)# interface ethernet 1/3
device(config-if-eth-1/3)# qos dscp-mutation dscp_mutation_map
```

To apply a QoS DSCP-to-DSCP mutation map to a specific port channel interface:

```
device# configure terminal
device(config)# interface port-channel 22
device(config-port-channel-22)# qos dscp-mutation dscp_mutation_map
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# qos dscp-traffic-class

Applies a user configured QoS DSCP-to-traffic- class mutation map to an interface.

## Syntax

```
qos dscp-traffic-class dscp_tc_name
```

## Command Default

No explicit user configured QoS DSCP-to-traffic class map is enabled on the interface.

## Parameters

*dscp\_tc\_name*  
Name of DSCP-to-traffic class map

## Modes

Interface configuration mode

## Usage Guidelines

Mutation mapping is a method of modifying a QoS field in all packets on an interface. On ingress, mutation mapping occurs before traffic classification and all other actions. On egress, mutation mapping occurs after traffic classification and before all other actions.

## Examples

Follow this example to apply a QoS DSCP-to-traffic class mutation map to a specific 40-gigabit Ethernet interface

```
device# configure terminal
device(config)# interface ethernet 2/2
device(config-if-eth-2/2)# qos dscp-traffic-class dscp_tc_map
```

Follow this example to apply a QoS DSCP-to-traffic class mutation map to a specific port channel interface

```
device# configure terminal
device(config)# interface port-channel 22
device(config-port-channel-22)# qos dscp-traffic-class dscp_tc_map
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# qos flowcontrol rx

Configures link-level flow control (IEEE 802.3x Flow Control) in the receive direction on an interface.

## Syntax

```
qos flowcontrol rx { on | off }
no qos flowcontrol
```

## Command Default

By default, link-level flow control is disabled on an interface.

## Parameters

**on**  
Enables flow control on the interface.

**off**  
Disables flow control on the interface.

## Modes

Interface configuration mode

## Usage Guidelines

Link level flow control (LLFC) is a way to alleviate system congestion by pausing data transmission. Link level flow control allows a congested receiver to communicate a PAUSE frame to a transmitter to stop data transmission until the congestion is cleared.

The device supports flow control in the receive direction only and does not support the generation of the PAUSE frame.

Link level flow control can only be configured at the interface level.

Use the **no** form of this command or the **off** keyword to disable flow control on the interface.

## Examples

The following example configures flow control on an interface.

```
device# configure terminal
device(config)# interface ethernet 1/4
device(conf-eth-1/4)# qos flowcontrol rx on
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# qos map cos-mutation

Creates a QoS map for performing CoS-to-CoS mutation.

## Syntax

```
qos map cos-mutation name cos0 cos1 cos2 cos3 cos4 cos5 cos6 cos7
no qos map cos-mutation name
```

## Command Default

No CoS-to-CoS mutation QoS maps are defined.

## Parameters

*name*

Specifies a unique name across all CoS-to-CoS mutation QoS maps defined within the system. If the named CoS-to-CoS mutation QoS map does not exist, then it is created. If the named CoS-to-CoS mutation QoS map already exists, then it is updated and new mapping is automatically propagated to all interfaces bound to the QoS map.

*cos#*

Specifies the outbound CoS value.

CoS value	Description
<i>cos0</i>	Sets the outbound CoS value for all packets with inbound CoS 0.
<i>cos1</i>	Sets the outbound CoS value for all packets with inbound CoS 1.
<i>cos2</i>	Sets the outbound CoS value for all packets with inbound CoS 2.
<i>cos3</i>	Sets the outbound CoS value for all packets with inbound CoS 3.
<i>cos4</i>	Sets the outbound CoS value for all packets with inbound CoS 4.
<i>cos5</i>	Sets the outbound CoS value for all packets with inbound CoS 5.
<i>cos6</i>	Sets the outbound CoS value for all packets with inbound CoS 6.
<i>cos7</i>	Sets the outbound CoS value for all packets with inbound CoS 7.

## Modes

Global configuration mode

## Usage Guidelines

A CoS-to-CoS mutation takes an inbound CoS value and maps it to an outbound CoS value. The inbound CoS value is the user priority after any interface ingress QoS trust and Interface default CoS policy have been applied. The outbound CoS value is used in selecting Traffic Class and egress packet marking.

Enter **no qos map cos-mutation** *name* command to delete the named CoS-to-CoS mutation QoS map. A QoS map can only be deleted if it is not bound to any interface.

## Examples

To create a CoS-to-CoS QoS mutation map to swap CoS 4 and CoS 5 and apply it on an interface, for example having inbound CoS 4 mapped to outbound CoS 5 and inbound CoS 5 mapped to outbound CoS 4; but all other CoS values go through unchanged:

```
device# configure terminal
device(config)# qos map cos-mutation cosMap 0 1 2 3 5 4 6 7
device(config)# interface ethernet 2/1
device(conf-if-eth-2/1)# qos cos-mutation cosMap
```

To delete a CoS-to-CoS QoS mutation map:

```
device# configure terminal
device(config)# no qos map cos-mutation cosMap
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# qos map cos-traffic-class

A QoS CoS-to-traffic class mutation map can be configured using the following command syntax

## Syntax

```
qos map cos-traffic-class name
no qos map cos-traffic-class name
```

## Command Default

If CoS-to-traffic class mutation map is not defined, the default CoS-to-traffic class map is used, which is a one-to-one map for each priority.

## Parameters

*name*

Specifies a unique name for the CoS-to-traffic class mutation QoS map. If the named map does not exist, then it is created. If the map already exists, then it is updated and new mapping is automatically propagated to all interfaces bound to the map.

## Modes

Global configuration mode

## Usage Guidelines

A CoS-to-traffic class mutation map takes an inbound CoS value and maps it to an outbound traffic class (priority queue) value. The inbound CoS value is the user priority after any interface ingress QoS trust and Interface default CoS policy have been applied.

The drop-precedence parameter is optional.

Enter **no qos map cos-traffic-class *name*** command to delete the named QoS CoS-to-traffic class mutation map.

A QoS map can only be deleted if it is not bound to an interface.

## Examples

To create a QoS CoS-to-traffic class mutation map use the following command

```
device# configure terminal
device(config)# qos map cos-traffic-class cosTC1
device(cos-traffic-class-cosTC1)# map cos 4 to traffic-class 3 drop-precedence 0
device(cos-traffic-class-cosTC1)# map cos 5 to traffic-class 5 drop-precedence 1
device(cos-traffic-class-cosTC1)# map cos 6 to traffic-class 6 drop-precedence 0
device(cos-traffic-class-cosTC1)# map cos 7 to traffic-class 6 drop-precedence 1
device(cos-traffic-class-cosTC1)# interface ethernet 1/1
device(conf-if-eth-1/1)# qos cos-traffic-class cosTC1
```

To delete a QoS CoS-to-traffic class mutation map that is bound to an interface follow this example.

```
device# configure terminal
device(config)# interface ethernet 1/1
device(conf-if-eth-1/1)# no qos cos-traffic-class cosTC1
device(conf-if-eth-1/1)# exit
device(config)# no qos map cos-traffic-class cosTC1
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# qos map dscp-cos

Creates a QoS map where the ingress DSCP value is mapped to outgoing 802.1P values. This configures a DSCP-to-CoS map on the ingress interface.

## Syntax

```
qos map dscp-cos name
no qos map dscp-cos name
map dscp ingress dscp values to cos cos
```

## Command Default

DSCP-to-CoS mutation is not enabled.

## Parameters

*name*  
Name of DSCP-to-CoS map

**map dscp**  
Ingress DSCP values.

**cos**  
Egress CoS values.

*ingress dscp values*  
Input DSCP values. The range of ingress DSCP values is 0 through 63.

*cos*  
CoS value. The range is 0 through 7.

## Modes

dscp-cos mode for the QoS **map dscp** commands  
Global configuration mode

## Usage Guidelines

This command remaps the incoming DSCP values of the ingress packet to egress CoS 802.1P values.

When you enter **qos map dscp-cos**, the system is placed in dscp-cos mode for the configured map. At this point, you can map ingress DSCP values to egress CoS values using the **map dscp** command.

Enter **qos dscp-cos name** while in configuration mode for a specific interface to apply the DSCP-to-CoS map to that interface.

Enter **no qos dscp-cos name** while in the interface configuration mode to remove the DSCP-to-CoS map from the interface.

Enter **no map dscp-cos name** while in global configuration mode to remove the DSCP-to-CoS map.

## Examples

To create a QoS DSCP-to-CoS map and place system into dscp-cos mode:

```
device# configure terminal
device(config)# qos map dscp-cos test
device(dscp-cos-test)#
```

To map an ingress DSCP value to egress CoS value while in dscp-cos mode:

```
device# configure terminal
device(config)# qos map dscp-cos test
device(dscp-cos-test)# map dscp 43 to cos 4
```

To map multiple ingress DSCP values to egress CoS values while in dscp-cos mode:

```
device# configure terminal
device(config)# qos map dscp-cos test
device(dscp-cos-test)# map dscp 43 to cos 4
device(dscp-cos-test)# map dscp 63 to cos 6
device(dscp-cos-test)# map dscp 53 to cos 5
device(dscp-cos-test)# map dscp 23 to cos 2
```

To remove a QoS DSCP-CoS map while in global configuration mode:

```
device# configure terminal
device(config)# no qos map dscp-cos test
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# qos map dscp-mutation

Creates a DSCP mutation by mapping the incoming DSCP value of the ingress packet to outgoing DSCP values.

## Syntax

```
qos map dscp-mutation name
no map qos dscp-mutation name
map dscp ingress dscp values to dscp egress dscp value
```

## Command Default

DSCP mutation is not enabled.

## Parameters

*name*  
Name of DSCP mutation map

**map dscp**  
Inbound DSCP values.

*ingress dscp values*  
The ingress DSCP values. The range is from 0 through 63.

**dscp**  
Outbound DSCP values.

*egress dscp values*  
The egress DSCP value. The range is from 0 through 63.

## Modes

dscp-mutation mode for the DSCP mutation map  
Global configuration mode

## Usage Guidelines

Enter **qos dscp-mutation** *name* while in configuration mode for a specific interface to apply the DSCP mutation map to that interface. When you enter **qos map dscp-mutation**, the system is placed in dscp-mutation mode for the configured map. At this point, you can map ingress DSCP values to egress DSCP values using the **dscp map** command.

Enter **no qos dscp-mutation** *name* while in interface configuration mode to remove the DSCP mutation map from that interface.

Enter **no map dscp-mutation** *name* while in global configuration mode to remove the DSCP mutation map.

## Examples

To create a QoS DSCP mutation map and place system into dscp-mutation mode:

```
device# configure terminal
device(config)# qos map dscp-mutation test
device(dscp-mutation-test)#
```

To map an ingress DSCP value to egress DSCP values while in dscp-mutation mode:

```
device# configure terminal
device(config)# qos map dscp-mutation test
device(dscp-mutation-test)# map dscp 1,3,5,7 to dscp 40
```

To map multiple ingress DSCP values to egress DSCP values while in dscp-mutation mode:

```
device# configure terminal
device(config)# qos map dscp-mutation test
device(dscp-mutation-test)# map dscp 60 to dscp 40
device(dscp-mutation-test)# map dscp 24 to dscp 50
device(dscp-mutation-test)# map dscp 33 to dscp 35
device(dscp-mutation-test)# map dscp 53 to dscp 61
```

To remove a QoS DSCP mutation map while in global configuration mode:

```
device# configure terminal
device(config)# no qos map dscp-mutation test
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# qos map dscp-traffic-class

Creates a QoS map for performing DSCP-to-traffic class mapping. This creates a DSCP-to-traffic class map on the ingress interface. You can configure an interface with either a DSCP-to-traffic class map or a CoS-to-traffic class map.

## Syntax

```
qos map dscp-traffic-class name
```

```
no qos map dscp-traffic-class name
```

```
map dscp ingress dscp values to traffic-class traffic class [ drop-precedence out drop precedence ]
```

## Command Default

DSCP-to-traffic class mutation is not enabled.

## Parameters

*name*

Name of the QoS DSCP-to-traffic clas map.

**map dscp**

Ingress DSCP values. The range of ingress DSCP values is 0 through 63.

**traffic-class**

Egress traffic class values. The range of ingress traffic class values is from 0 through 7.

**drop-precedence**

Drop precedence value given egress packets. The range is 0 through 3.

*ingress dscp values*

Range of input DSCP values. The range is 0 through 63.

*traffic class*

The traffic class value. the range is from 0 through 7.

*out drop precedence*

Value of the output drop precedence. The range is 0 through 3.

## Modes

dscp-traffic-class mode for the DSCP-to-traffic class map

Global configuration mode

## Usage Guidelines

Enter **qos dscp-traffic-class** *name* while in configuration mode for a specific interface to apply the QoS DSCP-Traffic-Class map to that interface. When you enter **qos map dscp-traffic-class**, the system is placed in dscp-traffic-class mode for the configured map. At this point, you can map ingress DSCP values to traffic class values using the **mark** command.

Enter **no qos dscp-traffic-class** *name* while in the interface mode to remove the map from that interface.

## Examples

To create a QoS DSCP-to-traffic class map and place system into dscp-traffic-class mode:

```
device# configure terminal
device(config)# qos map dscp-traffic-class test
device(dscp-traffic-class-test)#
```

To map ingress DSCP values to a traffic class while in dscp-traffic-class mode:

```
device# configure terminal
device(config)# qos map dscp-traffic-class test
device(dscp-traffic-class-test)# map dscp 1,3,5,7 to traffic-class 1 drop-precedence 1
```

To map multiple ingress DSCP values to traffic classes and drop precedence while in dscp-traffic-class mode:

```
device# configure terminal
device(config)# qos map dscp-traffic-class test
device(dscp-traffic-class-test)# map dscp 10 to traffic-class 3 drop-precedence 1
device(dscp-traffic-class-test)# map dscp 40 to traffic-class 4 drop-precedence 1
device(dscp-traffic-class-test)# map dscp 45 to traffic-class 5 drop-precedence 0
device(dscp-traffic-class-test)# map dscp 52 to traffic-class 3 drop-precedence 1
```

To remove a QoS DSCP-traffic class map while in global configuration mode:

```
device# configure terminal
device(config)# no qos map dscp-traffic-class test
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# qos map traffic-class-cos

A QoS traffic class-to-CoS mutation map can be configured to create a priority mapping table using a traffic-class-cos map. The traffic class-to-CoS map is then applied to an egress interface to effect the priority re-mapping.

## Syntax

```
qos map traffic-class-cos name
no qos map traffic-class-cos name
```

## Command Default

If a QoS traffic class-to-CoS mutation map is not defined, the default traffic class-to-CoS map is used, which is a one-to-one map for each priority.

## Parameters

*name*

Specifies a unique name for the QoS traffic class-to-CoS mutation map. If the named map does not exist, then it is created. If the map already exists, then it is updated and new mapping is automatically propagated to all interfaces bound to the map.

## Modes

Global configuration mode

## Usage Guidelines

A traffic class can be mapped to the outgoing PCP value when a packet egresses the switch. You can create a priority mapping table using a traffic class-to-CoS map. This traffic class-to-CoS map can then be applied to an egress interface to effect the priority re-mapping. This feature only maps the internal traffic class to outgoing priority.

Enter **no qos map traffic-class-cos name** command to delete the named QoS traffic class-to-CoS mutation map.

A QoS map can only be deleted if it is not bound to an interface.

## Examples

To create and apply a QoS traffic class-to-CoS mutation map use the following command:

```
device# configure terminal
device(config)# qos map traffic-class-cos CoSMap
device(traffic-class-cos-CoSMap)# map traffic-class 3 drop-precedence 1 to cos 2
device(traffic-class-cos-CoSMap)# map traffic-class 4 drop-precedence 1 to cos 3
device(traffic-class-cos-CoSMap)# map traffic-class 5 drop-precedence 2 to cos 4
device(conf-if-eth-1/4)# qos traffic-class-cos tcCos1
```

To delete a QoS traffic class-to-CoS mutation map that is bound to an interface follow this example.

```
device# configure terminal
device(config)# interface ethernet 1/4
device(conf-if-eth-1/4)# no qos traffic-class-cos CoSMap
device(conf-if-eth-1/4)# exit
device(config)# no qos map traffic-class-cos CoSMap
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# qos-mpls map dscp-exp

Creates and populates an MPLS QoS differentiated services code point (DSCP) to EXP mutation map.

## Syntax

```
qos-mpls map dscp-exp mapname { dscp dscp_value to exp exp_value }
[no] qos-mpls map dscp-exp mapname [ dscp dscp_value to exp exp_value ]
```

## Parameters

*mapname*

The name of the MPLS QoS DSCP-to-EXP mutation map. The name can be up to 64 characters.

**dscp**

Specifies that the ingress DSCP value follows.

*dscp\_value*

The ingress DSCP value. The range is from 0 through 63.

**exp**

Specifies that the egress EXP value follows.

*exp\_value*

The egress EXP value. The range is from 0 through 7.

## Modes

Global configuration mode

dscp-exp-mapname configuration mode

## Usage Guidelines

Creating the map and setting the initial mutation places the device into `dscp-exp-mapname` configuration mode where you continue to populate the map using the **dscp** command.

MAC filter and DSCP marking cannot be configured on the same port.

## Examples

Follow this example to create an MPLS QoS DSCP-to-EXP mutation map.

```
device# configure terminal
device(config)# qos-mpls map dscp-exp dscpExpMap dscp 0 to exp 1
device(dscp-exp-dscpExpMap)# dscp 3 to exp 2
device(dscp-exp-dscpExpMap)# dscp 17 to exp 4
device(dscp-exp-dscpExpMap)# dscp 61 to exp 5
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# qos-mpls map exp-dscp

Creates and populates an MPLS QoS EXP to differentiated services code point (DSCP) mutation map.

## Syntax

```
qos-mpls map exp-dscp mapname { exp exp_value to dscp dscp_value }
[no] qos-mpls map exp-dscp mapname [ exp exp_value to dscp dscp_value ]
```

## Parameters

*mapname*

The name of the MPLS QoS EXP-to\_DSCP mutation map. The name can be up to 64 characters.

**exp**

Specifies that the egress EXP value follows.

*exp\_value*

The ingress EXP value. The range is from 0 through 7.

**dscp**

Specifies that the egress DSCP value follows.

*dscp\_value*

The egress DSCP value. The range is from 0 through 63.

## Modes

Global configuration mode

exp-dscp-mapname configuration mode

## Usage Guidelines

Creating the map and setting the initial mutation places the device into exp-dscp-mapname configuration mode where you continue to populate the map using the **exp** command.

## Examples

Follow this example to create an MPLS QoS EXP-to-DSCP mutation map.

```
device# configure terminal
device(config)# qos-mpls map exp-dscp expDscpMap exp 1 to dscp 2
device(exp-dscp-expDscpMap)# exp 2 to dscp 4
device(exp-dscp-expDscpMap)# exp 4 to dscp 8
device(exp-dscp-expDscpMap)# exp 6 to dscp 12
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# qos-mpls map exp-traffic-class

Creates and populates an MPLS QoS EXP to traffic class mutation map.

## Syntax

```
qos-mpls map exp-traffic-class mapname { exp exp_value to traffic-class traffic_class_value drop-precedence
drop_precedence_value }
```

```
[no] qos-mpls map exp-traffic-class mapname [ exp exp_value to traffic-class traffic_class_value drop-precedence
drop_precedence_value ]
```

## Parameters

*mapname*

The name of the MPLS QoS EXP-to-traffic class mutation map. The name can be up to 64 characters.

**exp**

Specifies that the egress EXP value follows.

*exp\_value*

The ingress EXP value. The range is from 0 through 7.

**traffic-class**

Specifies that the egress traffic class value follows.

*traffic\_class\_value*

The egress traffic class value. The range is from 0 through 63.

**drop-precedence**

Specifies that the traffic class drop precedence value follows.

*drop\_precedence\_value*

The egress traffic class drop precedence value. The range is from 0 through 3.

## Modes

Global configuration mode

exp-traffic-class-mapname configuration mode

## Usage Guidelines

Creating the map and setting the initial mutation places the device into exp-traffic-class-mapname configuration mode where you continue to populate the map using the **exp** command.

## Examples

Follow this example to create an MPLS QoS EXP-to-traffic class mutation map.

```
device# configure terminal
device(config)# qos-mpls map exp-traffic-class expTCMap exp 1 to traffic-class 2 drop-precedence 2
device(exp-traffic-class-expTCMap)# exp 2 to traffic-class 4 drop-precedence 2
device(exp-traffic-class-expTCMap)# exp 4 to traffic-class 8 drop-precedence 2
device(exp-traffic-class-expTCMap)# exp 6 to traffic-class 12 drop-precedence 2
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# qos-mpls map traffic-class-exp

Creates and populates an MPLS QoS traffic class-to-EXP mutation map.

## Syntax

```
qos-mpls map traffic-class-exp mapname { traffic-class traffic_class_value drop-precedence drop_precedence_value to exp
exp_value }
```

```
[no] qos-mpls map traffic-class-exp mapname [ traffic-class traffic_class_value drop-precedence drop_precedence_value
to exp exp_value ]
```

## Parameters

*mapname*

The name of the MPLS QoS traffic class-to-EXP mutation map. The name can be up to 64 characters.

**traffic-class**

Specifies that the ingress traffic class value follows.

*traffic\_class\_value*

The ingress traffic class value. The range is from 0 through 63.

**drop-precedence**

Specifies that the traffic class drop precedence value follows.

*drop\_precedence\_value*

The egress traffic class drop precedence value. The range is from 0 through 3.

**exp**

Specifies that the egress EXP value follows.

*exp\_value*

The egress EXP value. The range is from 0 through 7.

## Modes

Global configuration mode

traffic-class-exp-mapname configuration mode

## Usage Guidelines

Creating the map and setting the initial mutation places the device into `traffic-class-exp-mapname` configuration mode where you continue to populate the map using the **traffic-class** command.

## Examples

Follow this example to create an MPLS QoS traffic class-to-EXP mutation map.

```
device# configure terminal
device(config)# qos-mpls map traffic-class-exp tcExpMap traffic-class 0 drop-precedence 2 to exp 1
device(traffic-class-exp-tcExpMap)# traffic-class 3 drop-precedence 2 to exp 4
device(traffic-class-exp-tcExpMap)# traffic-class 4 drop-precedence 2 to exp 5
device(traffic-class-exp-tcExpMap)# traffic-class 5 drop-precedence 2 to exp 6
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# qos-mpls map-apply dscp-exp

Applies an MPLS DSCP to EXP mutation map globally.

## Syntax

```
qos-mpls map-apply dscp-exp { map_name | all-zero-map | default-map } { all }
[no] qos-mpls map-apply dscp-exp
```

## Parameters

*map\_name*

The name of the user-defined map that you are applying.

**all-zero-map**

Maps the DSCP values to EXP 0.

**default-map**

Maps the DSCP to EXP values based on the default map.

**all**

Applies the map globally.

## Modes

Global configuration mode

## Examples

Follow this example to apply a MPLS DSCP to EXP mutation map.

```
device# configure terminal
device(config)# qos-mpls map-apply dscp-exp dscpExpMap all
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# qos-mpls map-apply exp-dscp

Applies an MPLS EXP to DSCP mutation map globally.

## Syntax

```
qos-mpls map-apply exp-dscp { map_name | all-zero-map | default-map } { all }
[no] qos-mpls map-apply exp-dscp
```

## Parameters

*map\_name*

The name of the user-defined map that you are applying.

**all-zero-map**

Maps the EXP values to DSCP 0.

**default-map**

The EXP to DSCP value is based on the default map.

**all**

Applies the map globally.

## Modes

Global configuration mode

## Examples

Follow this example to apply a MPLS EXP to DSCP mutation map.

```
device# configure terminal
device(config)# qos-mpls map-apply exp-dscp expDscppMap all
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# qos-mpls map-apply exp-traffic-class

Applies an MPLS EXP to traffic class mutation map globally.

## Syntax

```
qos-mpls map-apply exp-traffic-class { map_name | all-zero-map | default-map } { all }
[no] qos-mpls map-apply exp-traffic-class
```

## Parameters

*map\_name*

The name of the user-defined map that you are applying.

**all-zero-map**

Maps the EXP values to internal traffic class 0 and drop precedence 0.

**default-map**

Maps the EXP to internal traffic class values and drop precedence based on the default map.

**all**

Applies the map globally.

## Modes

Global configuration mode

## Examples

Follow this example to apply a MPLS EXP to traffic class mutation map.

```
device# configure terminal
device(config)# qos-mpls map-apply exp-traffic-class expTrafficClassMap all
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# qos-mpls map-apply traffic-class-exp

Applies an MPLS traffic class mutation to EXP map globally.

## Syntax

```
qos-mpls map-apply traffic-class-exp { map_name | all-zero-map | default-map } { all }
[no] qos-mpls map-apply traffic-class-exp
```

## Parameters

*map\_name*

The name of the user-defined map that you are applying.

**all-zero-map**

Maps the internal traffic class and drop precedence values to EXP 0.

**default-map**

Maps the internal traffic class and drop precedence values to EXP based on the default map.

**all**

Applies the map globally.

## Modes

Global configuration mode

## Examples

Follow this example to apply a MPLS traffic class to EXP mutation map.

```
device# configure terminal
device(config)# qos-mpls map-apply traffic-class-exp trafficClassExpMap all
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# qos random-detect traffic-class

Configures Random Early Detect (RED) profile on a traffic class of an interface

## Syntax

```
qos random-detect traffic-class traffic-class [ drop-precedence value ] red-profile-id ID
no qos random-detect traffic-class traffic-class [ drop-precedence ]
```

## Parameters

*traffic-class*

Specifies the traffic class to apply the RED profile. Enter an integer from 0 through 7.

**drop-precedence** *value*

Optionally, specifies the drop precedence value for the traffic class. Enter an integer from 1 from 3.

**red-profile-id** *ID*

Specifies the RED profile to assign to traffic class on the interface. Enter the identifier for a configured profile.

## Modes

Interface configuration mode

## Usage Guidelines

Use the **no** form of the command to remove the RED profile from the interface or the drop precedence for the traffic class on the interface.

## Examples

The following example configures an RED profile on an interface.

```
device# configure terminal
device(config)# interface ethernet 1/4
device(conf-if-eth-1/4)# qos random-detect traffic-class 1 red-profile-id 1
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# qos red-profile

Configures a weighted random early detection (WRED) profile which includes the setting of the thresholds and drop probability by percentage.

## Syntax

```
qos red-profile profile-ID min-threshold min-percentage max-threshold max-percentage drop-probability percentage
```

```
no qos red-profile profile-ID
```

## Parameters

*profile-ID*

Specifies the profile identifier. Enter an integer from 0 to 383.

**min-threshold** *min-percentage*

Specifies the minimum average queue size in percentage for randomly dropping packets. Enter an integer from 0 through 100.

**max-threshold** *max-percentage*

Specifies the maximum average queue size in percentage which all packets are accepted by the device. Enter an integer from 0 through 100.

**drop-probability** *percentage*

Specifies the drop probability in percentage when the queue size is at the maximum. Enter an integer from 0 through 100.

## Modes

Global configuration mode

## Usage Guidelines

You can configure a maximum on 256 profiles.

After configuring the profile, apply it to an interface with the **qos random-detect traffic-class** command.

Use the **no** form of this command to delete the profile.

## Examples

The following example is a WRED configuration.

```
device# configure terminal
device(config)# qos red-profile 1 min-threshold 30 max-threshold 60 drop-probability 44
```

## History

Release version	Command history
16.1.00	This command was introduced.

# qos rx-queue cos-threshold

Configures the QoS ingress queue cost of service (CoS) thresholds.

## Syntax

```
qos rx-queue cos-threshold threshold_value_0 threshold_value_1 threshold_value_2 threshold_value_3 threshold_value_4
threshold_value_5 threshold_value_6 threshold_value_7
```

```
[no] qos rx-queue cos-threshold
```

## Command Default

The CoS threshold values for the ingress queue are not configured.

## Parameters

*threshold\_value\_n*

There are eight entries for this parameter with each entry representing a percentage. Each position matches a specific inbound CoS with the first position (**cos\_threshold\_0**) representing CoS 0, the second CoS 1, and so on.

## Modes

Ethernet interface configuration mode.

## Usage Guidelines

The total of all the entries cannot exceed 100%.

A 0 may be entered for any of the values.

## Examples

Follow this example to configure the QoS ingress queue CoS thresholds on a specific Ethernet interface.

```
device# configure terminal
device(config)# interface ethernet 1/5
device(conf-if-eth-1/5)# qos rx-queue cos-threshold 10 10 10 10 10 20 20 10
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# qos rx-queue multicast

Configures the multicast packet handling on an interface for virtual output queuing.

## Syntax

**qos rx-queue multicast** { **best-effort-rate** | **guarantee-rate** } *kbps*

**qos rx-queue multicast traffic class** *number* **min-queue-size** *Mbytes* **max-queue-size** *Mbytes*

**no qos rx-queue multicast best-effort-rate** | **guarantee-rate**

**no qos rx-queue multicast traffic class** *number* **min-queue-size** *Mbytes* **max-queue-size** *Mbytes*

## Parameters

**best-effort-rate** *kbps*

Specifies the multicast best effort data rate in kilobits per second (kbps). Enter an integer from 704 through 600000000.

**guarantee-rate** *kbps*

Specifies the multicast data guarantee data rate in kilobits per second (kbps). Enter an integer from 704 through 600000000.

**traffic class** *number*

Specifies the traffic class on the interface. Enter an integer from 0 to 7.

**min-queue-size** *Mbytes*

Specifies the minimum queue size in megabytes per second. Enter an integer from 0 through 1024.

**max-queue-size** *Mbytes*

Specifies the maximum queue size in megabytes per second. Enter an integer from 0 through 2048.

## Modes

Interface configuration mode

## Usage Guidelines

Use the **no** form of this command to remove the packet handling configuration.

## Examples

The following example configures the multicast packet handling on the interface for virtual output queuing.

```
device# configure terminal
device(config)# interface ethernet 1/2
device(conf-if-eth-1/2)# qos rx-queue multicast best-effort-rate 3000
device(conf-if-eth-1/2)# qos rx-queue multicast guarantee-rate 30000
device(conf-if-eth-1/2)# qos rx-queue multicast traffic-class 3 min-queue-size 512 max-queue-size 1024
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# qos rx-queue unicast traffic-class

Configures the ingress queue unicast packet traffic class parameter on an Ethernet interface.

## Syntax

```
qos rx-queue unicast traffic-class traffic_class min-queue-size minimum_size max-queue-size maximum_size
no qos rx-queue unicast traffic class number min-queue-size Mbytes max-queue-size Mbytes
```

## Parameters

**traffic class** *number*

Specifies the traffic class on the interface. Enter an integer from 0 to 7.

**min-queue-size** *Mbytes*

Specifies the minimum queue size in megabytes per second. Enter an integer from 0 through 1024.

**max-queue-size** *Mbytes*

Specifies the maximum queue size in megabytes per second. Enter an integer from 0 through 2048.

## Modes

Ethernet interface configuration mode

## Examples

The following example configures an Ethernet interface ingress queue minimum and maximum queue size by a traffic class. .

```
device# configure terminal
device(config)# interface ethernet 1/2
device(conf-if-eth-1/2)# qos rx-queue unicast traffic-class 3 min-queue-size 128 max-queue-size 1024
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# qos service-policy

Applies a policy map to all inbound traffic.

## Syntax

```
qos service-policy in service_policy_name
```

```
no qos service-policy in service_policy_name
```

## Parameters

**in**

Applies the service policy to inbound traffic.

*service\_policy\_name*

The name of the policy map.

## Modes

Global configuration mode.

## Usage Guidelines

The policy map has been preconfigured.

Enter **no qos service-policy in *service\_policy\_name*** to return to the default.

## Examples

This example binds a service policy to inbound traffic at the system level.

```
device# configure terminal
device(config)# qos service-policy in policyMap1
device(config-service-policy-in/policyMap1)# end
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# qos traffic-class

Applies a QoS default traffic class value to an interface.

## Syntax

```
qos traffic-class default_tc_value
```

## Command Default

No explicit user configured QoS default traffic class priority value is configured.

## Parameters

*default\_tc\_value*

The assigned traffic class priority value. The traffic class priority values range from 0 through 7.

## Modes

Interface configuration mode

## Examples

Follow this example to apply a default traffic class value to a specific Ethernet interface:

```
device# configure terminal
device(config)# interface ethernet 1/3
device(conf-if-eth-1/3)# qos traffic-class 3
```

Follow this example to apply a default traffic class value to a specific port channel interface:

```
device# configure terminal
device(config)# interface port-channel 22
device(config-port-channel-22)# qos traffic-class 3
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# qos traffic-class-cos

Applies a user configured QoS traffic class-to-CoS mutation map to an interface.

## Syntax

```
qos traffic-class-cos tc_cos_map
```

## Command Default

No explicit user configured QoS traffic class-to-CoS mutation maps are applied. The outbound traffic class equals the inbound traffic class.

## Parameters

*tc\_cos\_map*

The name of the user configured QoS traffic class-to-CoS mutation map.

## Modes

Interface configuration mode.

## Usage Guidelines

The mutation maps are preconfigured.

Mutation mapping is a method of modifying a QoS field in all packets on an interface. On ingress, mutation mapping occurs before traffic classification and all other actions. On egress, mutation mapping occurs after traffic classification and before all other actions.

## Examples

Follow this example to apply a user configured QoS traffic class-to-CoS mutation map to an Ethernet interface.

```
device# configure terminal
device(config)# interface ethernet 1/5
device(config-if-eth-1/5)# qos traffic-class-cos tc_cos_map
```

Follow this example to apply a user configured QoS traffic class-to-CoS mutation map) to a port channel interface.

```
device# configure terminal
device(config)# interface port-channel 22
device(config-port-channel-22)# qos traffic-class-cos tc_cos_map
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# qos tx-queue scheduler strict-priority

Configures the strict priority (SP) value for the egress queue traffic class scheduler and assigns a deficit weighted round robin (DWRR) weight.

## Syntax

```
qos tx-queue scheduler strict-priority traffic_class dwrr dwrr_weight
```

```
[no] qos tx-queue scheduler strict-priority traffic_class dwrr dwrr_weight
```

## Command Default

The SP value for the egress queue traffic class scheduler is not configured.

## Parameters

*traffic\_class*

There are eight traffic class values:

Value	Traffic class
0	No strict priority queue.
1	Traffic class 7 strict priority queue.
2	Traffic class 6 through 7 strict priority queues.
3	Traffic class 5 through 7 strict priority queues.
4	Traffic class 4 through 7 strict priority queues.
5	Traffic class 3 through 7 strict priority queues.
6	Traffic class 2 through 7 strict priority queues.
7	Traffic class 1 through 7 strict priority queues.

*dwrr dwrr\_weight*

Configure the DWRR queue weights. There are eight entries for this parameter with each entry representing a percentage. The total of all the entries cannot exceed 100%. Each entry position represents a specific traffic class:

Place	Assignment
1	Traffic class 0 DWRR weight.
2	Traffic class 1 DWRR weight.
3	Traffic class 2 DWRR weight.
4	Traffic class 3 DWRR weight.
5	Traffic class 4 DWRR weight.
6	Traffic class 5 DWRR weight.
7	Traffic class 6 DWRR weight.
8	Traffic class 7 DWRR weight.

## Modes

Global configuration mode

## Usage Guidelines

The no form, of the command removes the SP value for the egress queue traffic class scheduler.

## Examples

Use the following command to assign traffic classes 6 through 7 to a SP queue and assign DWRR weights.

```
device# configure terminal
device(config)# qos tx-queue scheduler strict-priority 2 dwrr 20 5 5 5 20 20
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# Commands R - Sh

---

## radius-server host

Specifies a Remote Authentication Dial-In User Service (RADIUS) server, including the VRF to use for communication with the server, and enters RADIUS server host VRF configuration mode.

### Syntax

```
radius-server host { ip-address | host_name } [ use-vrf [ vrf-name ] ]
```

```
no radius-server host { hostname | ip-address } [ use-vrf [ vrf-name ] ]
```

### Command Default

A RADIUS server is not configured.

### Parameters

*ipaddr*

Specifies the RADIUS server in IP address format. Both IPv4 and IPv6 addresses are supported.

*host\_name*

Specifies the RADIUS server in hostname format. The maximum supported length for the RADIUS server hostname is 40 characters.

**use-vrf**

(Optional) Causes communication with the RADIUS server through a specific VRF and enters configuration mode for RADIUS server communications through that VRF.

*vrf-name*

(Optional) Specifies a VRF through which to communicate with the RADIUS server. By default and when a VRF is not specified, the management VRF (mgmt-vrf) is used for communication with the RADIUS server.

### Modes

Global configuration mode

### Usage Guidelines

When a RADIUS server with the specified IP address or hostname does not exist, it is added to the server list. When the RADIUS server already exists, this command modifies the configuration.

The **no radius-server host** command removes the RADIUS server configuration.

#### NOTE

When only one RADIUS is configured, you can remove the RADIUS server configuration only when both login (EXEC) and command accounting are disabled by using, for example, the **no aaa accounting** command.

## Examples

The following example shows how to configure a RADIUS server.

```
device# configure terminal
device(config)# radius-server host 10.24.65.6
device(config-radius-server-10.24.65.6/mgmt-vrf) #
```

The following example shows how to configure a RADIUS server and specifies that communication with the server takes place through the green-vrf.

```
device# configure terminal
device(config)# radius-server host 10.24.65.6 use-vrf green-vrf
device(config-radius-server-10.24.65.6/green-vrf) #
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# raslog-duration

Configures the interval between RASLog messages that are sent when a port is disabled by the loop detection (LD) protocol.

## Syntax

```
raslog-duration minutes ]
no raslog-duration
```

## Command Default

See the Usage Guidelines.

## Parameters

*minutes*

Message interval in minutes. Range is from 10 through 1440. The default is 10.

## Modes

Protocol Loop Detection configuration mode

## Usage Guidelines

Use the **no** form of this command to revert to the default interval.

## Examples

To specify a RASLog message interval of 20 minutes:

```
device# configure terminal
device(config)# loop-detection
device(config-loop-detect)# raslog-duration 20
```

To revert to the default interval:

```
device# configure terminal
device(config)# loop-detection
device(config-loop-detect)# no raslog-duration 20
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# rd (EVPN VLAN/BD)

Configures a Virtual Private Network (VPN) route distinguisher for a VLAN/bridge domain (BD) in an Ethernet VPN (EVPN) default instance.

## Syntax

```
rd { admin-value:arbitrary-value | IP-address:arbitrary-value }
```

## Parameters

### *admin-value*

The administrative number assigned to the route. This can be a local ASN number or an IP address. The ASN number can be either a 2-byte number (from 0 through 65535) or a 4-byte number (from 0 through 4294967295).

### *arbitrary-value*

An arbitrary number you choose. The range of valid values is from 0 through 65535 if the ASN is an IP address or a 2 byte ASN. The range is 0 through 4294967295 if the ASN is a 4 byte ASN.

### *IP-address*

An IPv4 or IPv6 address.

## Modes

EVPN VLAN/BD configuration mode

## Usage Guidelines

## Examples

The following example configures an RD and assigns the local ASN number 200:1.

```
device# configure terminal
device(config)# evpn
device(config-evpn-default)# bridge-domain 200
device(config-bridge-domain-200)# rd 200:1
```

The following example configures an RD and assigns the IP address 10.1.1.1:1.

```
device# configure terminal
device(config)# evpn
device(config-evpn-default)# bridge-domain 200
device(config-bridge-domain-200)# rd 10.1.1.1:1
```

## History

Release version	Command history
17r.1.01	This command was introduced.

# rd auto (EVPN default instance)

Enables auto-generation of a route distinguisher (RD) for an Ethernet Virtual Private Network (EVPN) default instance.

## Syntax

`rd auto`

`no rd auto`

## Command Default

Disabled.

## Modes

EVPN default instance configuration mode

## Usage Guidelines

Use the **no** form of this command to disable autogeneration of an RD.

## Examples

To enable autogeneration of an RD:

```
device# configure terminal
device(config)# evpn
device(config-evpn-default)# rd auto
```

## History

Release version	Command history
17r.1.01	This command was introduced.

# reconnect-time

Specifies the amount of time that a graceful restart (GR) neighbor must wait for the LDP session to be reestablished.

## Syntax

**reconnect-time** *seconds*

**no reconnect-time** *seconds*

## Command Default

The default reconnect time is 120 seconds.

## Parameters

*seconds*

Specifies the amount of time in seconds that a GR neighbor must wait for the LDP session to be reestablished. This value is advertised to the neighbor using the FT Reconnect Timeout field in the FT Session TLV. Enter a integer from 60 to 300. The default setting is 120.

## Modes

MPLS LDP GR configuration mode

## Usage Guidelines

The **no** form of the command resets the default time of 120 seconds.

## Examples

The following example sets the LDP GR timer to 180 seconds.

```
device# configure terminal
device(config)# router mpls
device(config-router-mpls)# ldp
device(config-router-mpls-ldp)# graceful-restart
device(config-router-mpls-ldp-gr)# reconnect-time 180
```

## History

Release version	Command history
16r. 1.00	This command was introduced.

# record

The user can configure the record route option using the **record** command.

## Syntax

```
record { enable | disable }
```

## Command Default

The record route option is enabled by default.

## Parameters

### enable

Enables the record route option

### disable

Disables the record route option.

## Modes

MPLS router Bypass LSP configuration mode.

## Usage Guidelines

When enabled, the RSVP session messages of the bypass LSP records the bypass LSP actual path.

## Examples

The following example enables the record route option for bypass LSP *my-bypass-lsp*.

```
device>configure
device(config)# router mpls
device(config-router-mpls)# bypass-lsp my-bypass-lsp
device(config-router-mpls-bypass-lsp-my-bypass-lsp)# record enable
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# record-route

Use the **record-route** command's enable or disable options to set the record route option for the dynamic bypass LSPs to be created for the MPLS protected interface.

## Syntax

```
record-route { disable | enable }
```

## Command Default

Record route is enabled by default.

## Parameters

### disable

Disable the **record-route** command.

### enable

Enables the **record-route** command.

## Modes

MPLS router MPLS interface dynamic bypass configuration mode (config-router-mpls-if-ethernet-slot/port-dynamic-bypass).

## Usage Guidelines

Based on the value of the parameter, dynamic bypass LSPs create with their record-route option enabled or disabled.

## Examples

The following example enables record-route on the dynamic bypass MPLS Ethernet interface 2/8 .

```
device>configure
device(config)# router mpls
device(config-router-mpls)# mpls-interface ethernet 2/8
device(config-router-mpls-if-ethernet-2/8)# dynamic-bypass
device(config-router-mpls-if-ethernet-2/8-dynamic-bypass)# record-route enable
```

## History

Release version	Command history
17r.1.00	This command was introduced.



# recovery-time

Specifies the amount of time that this device retains its MPLS forwarding state across LDP graceful restart (GR).

## Syntax

**recovery-time** *seconds*

**no recovery-time** *seconds*

## Command Default

The default recovery time is 120 seconds.

## Parameters

*seconds*

Specifies the amount of time in seconds that this router retains its MPLS forwarding state across restart. This value is advertised to the neighbor using the Recovery Time field in the FT Session TLV. Enter a integer from 60 to 3600.

## Modes

MPLS LDP GR configuration mode

## Usage Guidelines

The recovery time must be chosen accordingly taking into account the time it takes for RTM to recompute the routes and the number of Layer 3 FECs that need to be recovered as part of the LDP GR recovery. This is applicable to GR processing on ingress as well as transit LSRs.

The **no** form of the command resets the default time of 120 seconds.

## Examples

The following example sets the LDP GR timer to 240 seconds.

```
device# configure terminal
device(config)# router mpls
device(config-router-mpls)# ldp
device(config-router-mpls-ldp)# graceful-restart
device(config-router-mpls-ldp-gr)# recovery-time 240
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# redistribute

Configures the device to redistribute IPv4 and IPv6 routes from one routing domain to another.

## Syntax

```

redistribute isis [ level-1 | level-1-2 | level-2 | metric num | route-map string ]
redistribute isis { level-1 into level-2 } [ prefix-list name ]
redistribute isis { level-2 into level-1 } [ prefix-list name ]
redistribute ospf [ match { external1 | external2 | internal } | metric num | metric-type { type1 | type2 } | route-map string ]
redistribute { source-protocol } [ metric num | metric-type { type1 | type2 } | route-map string ]
redistribute { source-protocol } [ level-1 | level-1-2 | level-2 | metric num | metric-type { type1 | type2 } | route-map string ]
no redistribute isis [ level-1 | level-1-2 | level-2 metric num | route-map string ]
no redistribute isis { level-1 into level-2 } [ prefix-list name ]
no redistribute isis { level-2 into level-1 } [ prefix-list name ]
no redistribute ospf [ match { external1 | external2 | internal } | metric num | metric-type { type1 | type2 } | route-map string ]
no redistribute { source-protocol } [ metric num | metric-type { type1 | type2 } | route-map string ]

```

## Command Default

The device does not redistribute routing information.

## Parameters

### isis

Specifies the ISIS protocol.

### level-1

Specifies L1 LSP, L1 CSNP and LI PSNP packets.

### level-1-2

Specifies both L1 LSP, L1 CSNP and LI PSNP packets and L2 LSP, L2 CSNP and L2 PSNP packets.

### level-2

Specifies L2 LSP, L2 CSNP and L2 PSNP packets.

### metric num

Specifies a metric for redistributed routes. Range is from 1 through 65535 in OSPFv2 and OSPFv3 configuration mode. Range is from 1 through 4261412863 in ISIS address-family IPv4/IPv6 unicast configuration mode and BGP address-family IPv4/IPv6 unicast configuration mode.

### route-map string

Specifies a route map to be consulted before a route is added to the routing table.

### level-1 into level-2

Redistributes Level 1 routes into Level 2.

**level-2 into level-1**

Redistributes Level 2 routes into Level 1.

**prefix-list** *name*

Specifies a prefix-list.

**ospf**

Specifies the OSPF protocol.

**match**

Specifies the type of route.

**external1**

Specifies OSPF Type 1 external routes.

**external2**

Specifies OSPF Type 2 external routes.

**internal**

Specifies OSPF internal routes.

**metric-type**

Specifies the external link type associated with the default route advertised into the OSPF routing domain.

**type1**

Specifies a type 1 external route.

**type2**

Specifies a type 2 external route.

*source-protocol*

Specifies the source protocol from which routes are being redistributed. It can be one of the following keywords: **bgp**, **connected**, or **static**.

## Modes

BGP address-family IPv4 unicast configuration mode

BGP address-family IPv6 unicast configuration mode

BGP address-family IPv4 unicast VRF configuration mode

BGP address-family IPv6 unicast VRF configuration mode

ISIS address-family IPv4 unicast configuration mode

ISIS address-family IPv6 unicast configuration mode

OSPF router configuration mode

OSPFv3 router configuration mode

OSPF router VRF configuration mode

OSPFv3 router VRF configuration mode

## Usage Guidelines

Routes can be filtered by means of an associated route map before they are distributed.

The **metric-type** { **type1** | **type2** } option is only available in OSPFv3 router, OSPFv3 router VRF, and ISIS address-family / IPv4/IPv6 unicast configuration mode.

The **redistribute** { *source-protocol* } [ **level-1** | **level-1-2** | **level-2** ] option is only available in ISIS address-family IPv4/IPv6 unicast configuration mode.

The **match**, **metric**, and **metric-type** options are not available in OSPF VRF configuration mode.

#### NOTE

The **default-metric** command does not apply to the redistribution of directly connected routes. Use a route map to change the default metric for directly connected routes.

The **no** form of the command restores the defaults.

## Examples

The following example redistributes IS-IS routes, specifying level 1 packets, in BGP address-family IPv4 unicast configuration mode.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv4 unicast
device(config-bgp-ipv4u)# redistribute isis level-1
```

The following example redistributes all IPv4 IS-IS routes from Level 2 into Level 1.

```
device# configure terminal
device(config)# router isis
device(config-bgp-isis)# address-family ipv4 unicast
evice(config-bgp-ipv4u)# redistribute isis level-2 into level-1
```

The following example redistributes OSPF external type 1 routes with a metric of 200 in BGP address-family IPv4 unicast configuration mode.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv4 unicast
device(config-bgp-ipv4u)# redistribute ospf match external1 metric 200
```

The following example redistributes OSPFv3 external type 2 routes in BGP address-family IPv6 unicast configuration mode.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv6 unicast
device(config-bgp-ipv6u)# redistribute ospf match external2
```

The following example redistributes static routes into BGP4 and specifies a metric of 200.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv4 unicast
device(config-bgp-ipv4u)# redistribute static metric 200
```

The following example redistributes directly connected routes into BGP4+.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv6 unicast
device(config-bgp-ipv6u)# redistribute connected
```

The following example redistributes directly connected routes into IS-IS.

```
device# configure terminal
device(config)# router bgp
device(config-isis-router)# address-family ipv6 unicast
device(config-router-isis-ipv6u)# redistribute connected
```

The following example redistributes BGP routes and specifies that route-map "rm7" be consulted in OSPF VRF configuration mode.

```
device# configure terminal
device(config)# router ospf
device(config-router-ospf-vrf-default-vrf)# redistribute bgp route-map rm7
```

The following example redistributes OSPF routes and specifies a type1 external route in OSPFv3 VRF configuration mode.

```
device# configure terminal
device(config)# ipv6 router ospf
device(config-ipv6-router-ospf-vrf-default-vrf)# redistribute ospf metric-type type1
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# refresh-reduction

When the user enables either of the refresh reduction extensions on an interface, outgoing RSVP packets sent on that interface sets the refresh reduction capability bit in the common RSVP header to indicate that the device is capable of receiving and processing refresh reduction messages and related objects.

## Syntax

```
refresh-reduction bundle-message [ bundle-send-delay milliseconds ] | summary-refresh
no refresh-reduction bundle-message [ bundle-send-delay milliseconds ] | summary-refresh
```

## Command Default

The RSVP bundle messages on the interface are disabled, by default.

## Parameters

### bundle-message

#### bundle-send-delay *milliseconds*

Specifies the bundle send delay value in milliseconds. the range is 20-1000 milliseconds, with a default of 40 milliseconds.

#### summary-refresh

Activates the refresh-reduction summary refresh.

## Modes

MPLS RSVP mode (config-router-mpls-rsvp).

MPLS interface RSVP mode (config-router-mpls-eth-x/x-rsvp).

## Usage Guidelines

Summary refresh is a more effective tool for RSVP refresh message overhead reduction.

Use the **no** version of the command to disable RSVP bundle messages.

## Examples

The following commands enable RSVP bundle messages on interface *3/13* with a **bundle-send-delay** of *20* milliseconds.

```
device# configure
device(config)# router mpls
device(config-router-mpls)# mpls-interface ethernet 3/13
device(config-router-mpls-eth-3/13)# rsvp
device(config-router-mpls-eth-3/13-rsvp)# refresh-reduction bundle-message bundle-send-delay 20
```

## History

Release version	Command history
16r.1.00	This command was introduced.

## region

Assigns a name to a Multiple Spanning Tree Protocol (MSTP) region.

## Syntax

**region** *region-name*

**no region**

## Parameters

*region-name*

Assigns a name to an MSTP region.

## Modes

Spanning tree MSTP configuration mode

## Usage Guidelines

The *region-name* string must be between 1 and 32 ASCII characters in length, and is case-sensitive.

Enter **no region** to delete the region name.

## Examples

To assign a name to an MSTP region named extreme1:

```
device# configure terminal
device(config)# protocol spanning-tree mstp
device(conf-mstp)# region extreme1
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# reliable-messaging

When RSVP reliable messaging is enabled on an interface of the SLX-OS device, RSVP trigger messages sent out on that interface includes a message ID and a request for acknowledgment from the RSVP neighbor.

## Syntax

```
reliable-messaging [ rapid-retrans-decay percent ] [ rapid-retrans-interval milliseconds ] [ rapid-retry-limit number ]
no reliable-messaging [ rapid-retrans-decay percent ] [ rapid-retrans-interval milliseconds ] [ rapid-retry-limit number ]
```

## Command Default

The command is disabled, by default.

## Parameters

### rapid-retrans-decay *percent*

Specifies the percentage increase in the rapid transmission interval for each consecutive unacknowledged RSVP message. The range is from 0 - 100, with a default of 100.

### rapid-retrans-interval *milliseconds*

Specifies the interval, in milliseconds, for an unacknowledged message to be resent. The range is from 100-30000 milliseconds, with a default of 2000 milliseconds.

### rapid-retry-limit *number*

Specifies the maximum number of retries for an unacknowledged message. The range is 1-16, with a default value of 5.

## Modes

MPLS interface RSVP mode (config-router-mpls-eth-x/x).

MPLS RSVP mode (config-router-mpls-rsvp).

## Usage Guidelines

When acknowledgment is not received, the trigger message is re-transmitted using the retransmission parameters configured on the interface.

The **no** form of the command removes reliable messaging.

## Examples

The following example enables RSVP reliable messaging on MPLS interface 3/13 .

```
device# configure
device(config)# router mpls
device(config-router-mpls)# mpls-interface ethernet 3/13
device(config-router-mpls-eth-3/13)# rsvp
device(config-router-mpls-eth-3/13-rsvp)# reliable-messaging
```

The following example configures the **rapid-retrans-decay** option to *1* percent, the **rapid-retrans-interval** option to *100* milliseconds, and the **rapid-retry-limit** option to *1* try.

```
device# configure
device(config)# router-mpls
device(config-router-mpls)# rsvp
device(config-router-mpls-rsvp)# reliable-messaging rapid-retrans-decay 1 rapid-retrans-interval 100
rapid-retry-limit 1
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# reload

Reboots the device, standby management module, or chassis.

## Syntax

```
reload { standby | system }
```

## Parameters

### standby

Reboots the standby management module.

### system

Reboots the chassis

## Modes

Privileged EXEC mode

## Usage Guidelines

All reboot operations are disruptive, and the commands prompt for confirmation before executing. When you reboot a device, all traffic to and from it stops. All ports on that device remain inactive until the device comes back online.

The **reload system** command performs a cold reboot that powers off and restarts the entire chassis. All session connections must be restarted. If the power-on self-test (POST) is enabled, POST is executed when the system comes back up.

### NOTE

Do not use the **reload** command without either the **standby** or **system** parameter.

## Examples

The following example performs a cold reboot of the device.

```
device# reload system
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# remote-mep

Associates an action profile to a RMEP for a scheduled Two-Way ETH-SLM or Two-Way ETH-DM.

## Syntax

**remote-mep** *rmep-id* **action-profile** *profile-name*

**no remote-mep**

## Parameters:

*rmep-id*

Specifies the RMEP ID.

**action-profile**

Specifies the action profile.

*profile-name*

Specifies the profile name.

## Modes

config-cfm-md-ma-mep configuration mode

## Usage Guidelines

Use the **no** form of the command delete the RMEP action profile associations.

## Examples

This example shows how to associate an action profile to a RMEP for a scheduled Two-Way ETH-SLM.

```
device# configure terminal
device(config)# protocol cfm
device(config-cfm)# domain-name md1 level 4
device(config-cfm-md-md1)# ma-name mal id 1 vlan-id 30 priority 3
device(config-cfm-md-ma-mal)# mep 1 down Ethernet 1/2
device(config-cfm-md-ma-mep-1)# remote-mep 2
device(config-cfm-md-ma-mep-1)# remote-mep 2 action-profile my_action_profile
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# rename

Renames a file in the device flash memory.

## Syntax

```
rename current_name new_name
```

## Parameters

*current\_name*

Specifies the file name you want to change.

*new\_name*

Specifies the new file name.

## Modes

Privileged EXEC mode

## Usage Guidelines

This command is supported only on the local device.

System configuration files cannot be renamed. If you try to rename a system file, a warning message is displayed.

## Examples

The following example renames a file in the flash memory.

```
device# rename myconfig myconfig_20101010
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# reoptimize-timer

The user can set a timer to optimize a specific LSP path on a periodic basis.

## Syntax

```
reoptimize-timer { seconds }
```

```
no reoptimize-timer { seconds }
```

## Command Default

The re-optimize timer is disabled, by default. Not configurable for a non-adaptive bypass LSP.

## Parameters

*seconds*

Specifies the length, in seconds, from the beginning of one re-optimization attempt to the beginning of the next attempt. The range is 300-65535 seconds.

## Modes

MPLS LSP configuration mode (`config-router-mpls-lsp-lsp_name`).

MPLS router Bypass LSP configuration mode (`config-router-mpls-bypass-lsp-bypass_name`).

MPLS router dynamic bypass configuration mode (`config-router-mpls-dynamic-bypass`).

## Usage Guidelines

Until a commit is issued the re-optimize timer is disabled.

Configuring a re-optimization timer does not interfere with running the manual **reoptimize** command.

Time-triggered re-optimizing does not apply to LSPs within a FRR network.

When upgrading software, the configured adaptive LSPs are initialized with the no re-optimization timer.

Use the **reoptimize-timer** command to configure a re-optimization timer for dynamic bypasses.

Dynamic bypass LSP re-optimization is enabled when the re-optimization value is set to a non-zero value, and the timer is set for the specified amount of seconds.

The **reoptimize-timer** value can also be configurable on MPLS interface mode. The global set value is applicable to all dynamic bypass LSPs for which the corresponding interface level re-optimization timer value is not set.

Use the **reoptimize-timer** command to configure a re-optimization timer value for all the dynamic bypass LSPs that are being created corresponding to a protected interface. When configured, this value overrides the global mode **reoptimize-timer** configured value.

When a dynamic bypass is non-adaptive, the **reoptimize-timer** is not considered for the dynamic bypass LSP.

The **no** form of the command removes the **reoptimize-timer** and sets it to the value set in the dynamic bypass global mode.

## Examples

In the following example, the re-optimize time is configured to 1000 seconds, which specifies the number of seconds from the beginning of one re-optimization attempt to the beginning of the next attempt.

```
device# configure
device(config)# router mpls
device(config-router-mpls)# lsp to20
device(config-router-mpls-lsp-to20)# reoptimize-timer 1000
device(config-router-mpls-lsp-to20)# commit
```

The following example configures the **reoptimize-timer** to 300 seconds under the MPLS router dynamic bypass configuration mode.

```
device>configure
device(config)# router-mpls
device(config-router-mpls)# dynamic-bypass
device(config-router-mpls-dynamic-bypass)# reoptimize-timer 300
```

The following example configures the reoptimize-timer to 360 seconds for dynamic bypass MPLS ethernet interface 2/8.

```
device>configure
device(config)# router-mpls
device(config-router-mpls)# mpls-interface ethernet 2/8
device(config-router-mpls-if-ethernet-2/8)# dynamic-bypass
device(config-router-mpls-if-ethernet-2/8-dynamic-bypass)# reoptimize-timer 360
```

## History

Release version	Command history
16r.1.00	This command was introduced.
17r.1.00	This command was modified to include the MPLS router bypass LSP configuration mode.

# resequence access-list

Reassigns sequence numbers to entries of an existing MAC, IPv4, or IPv6 access list.

## Syntax

```
resequence access-list { ip | ipv6 | mac } name seq_num increment
```

## Parameters

**ip | ipv6 | mac**

Specifies the Layer 2 or Layer 3 ACL bound to an interface.

*name*

Specifies the name of a standard or an extended ACL. A maximum of 63 characters is allowed.

*seq\_num*

Specifies the starting sequence number in the ACL. Valid values range from 1 through 65535.

*increment*

Specifies a value to increment the sequence number between rules. Valid values range from 1 through 65534.

## Modes

Privileged EXEC mode

## Usage Guidelines

Reordering the sequence numbers is useful when you need to insert rules into an existing ACL and there are not enough sequence numbers available. When all sequence numbers between rules are exhausted, this feature allows the reassigning of new sequence numbers to entries of an existing access list.

## Examples

The following example reorders the rules in a MAC ACL.

```
device# show running-config mac access-list test
!
mac access-list standard test
 seq 1 permit 0011.2222.3333
 seq 2 permit 0011.2222.4444
 seq 3 permit 0011.2222.5555
 seq 4 deny 0011.2222.6666
!
device# resequence access-list mac test 10 10

device# show running-config mac access-list test
!
mac access-list standard test
 seq 10 permit 0011.2222.3333
 seq 20 permit 0011.2222.4444
 seq 30 permit 0011.2222.5555
 seq 40 deny 0011.2222.6666
!
```



The following example reorders the rules in an IPv6 ACL.

```
device# show running-config ipv6 access-list distList
!
ipv6 access-list standard distList
 seq 10 deny 2001:125:132:35::/64
 seq 20 deny 2001:54:131::/64
 seq 30 deny 2001:5409:2004::/64
 seq 40 permit any!
device# resequence access-list ipv6 distList 100 100

device# show running-config ipv6 access-list distList
!
ipv6 access-list standard distList
 seq 100 deny 2001:125:132:35::/64
 seq 200 deny 2001:54:131::/64
 seq 300 deny 2001:5409:2004::/64
 seq 400 permit any
!
```

# reservable-bandwidth

The **reservable-bandwidth** command is configurable on an MPLS-enabled interface at any time. The configuration of the command takes effect immediately upon preemption of the LSP.

## Syntax

```
reservable-bandwidth { decimal | [ percentage decimal ] }
no reservable-bandwidth { decimal | [ percentage decimal ] }
```

## Command Default

The default value is the total physical bandwidth of the interface.

## Parameters

*decimal*

The decimal variable specifies a value from 0 through 2,000,000,000 in kbps.

**percentage***decimal*

The percentage decimal parameters specify a value from 0 through 100. The percentage value of 100 specifies that the entire interface bandwidth can be used by MPLS LSPs, when needed.

## Modes

MPLS interface mode (config-router-mpls-if-eth).

## Usage Guidelines

The no form of the command sets the maximum reservable bandwidth back to the default value.

When the maximum reservable bandwidth is configured as a percentage value for LAGs and VE interfaces, and ports go down, or new ports are added to the interface, the reservable bandwidth is recalculated as a percentage of the newly available bandwidth for that interface.

When the maximum reservable bandwidth is configured as either an absolute value, or a percentage value, the value is recalculated and updated to the latest value.

## Examples

The example below shows the configuration of the maximum reservable bandwidth for MPLS LSPs with an absolute value of 10000 kbps.

```
device# configure
device(config)# router mpls
device(config-router-mpls)# mpls-interface ethernet 1/1
device(config-router-mpls-if-eth-1/1)# reservable-bandwidth 10000
```

The following example configures the maximum reservable bandwidth as a percentage (80%) of the total interface bandwidth for the MPLS LSPs on the interface.

```
device# configure
device(config)# router mpls
device(config-router-mpls)# mpls-interface ethernet 1/1
device(config-router-mpls-if-eth-1/1)# reservable-bandwidth percentage 80
```

The following example shows when the maximum reservable bandwidth is changed from an absolute value to a percentage value, and vice versa, the following advisory message displays on the console to indicate the configuration change.

```
device# configure
device(config)# router mpls
device(config-router-mpls)# mpls-interface ethernet 1/1
device(config-router-mpls-if-eth-1/1)# reservable-bandwidth percentage 40
Maximum reservable bandwidth is changed from 30 kbps to 40%
```

The following example shows using the **no** form of the command to set the maximum reservable bandwidth back to the default value (the total physical bandwidth of the interface) when using the absolute value or percentage value.

```
device# configure
device(config)# router mpls
device(config-router-mpls)# mpls-interface ethernet 1/1
device(config-router-mpls-if-eth-1/1)# no reservable-bandwidth percentage 80
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# retain route-target all

Configures a route reflector (RR) to accept all route targets (RTs).

## Syntax

```
retain route-target all
no retain route-target all
```

## Command Default

This feature is disabled.

## Modes

BGP address-family L2VPN EVPN configuration mode

## Usage Guidelines

The **no** form of the command disables the retaining of all RTs.

## Examples

The following example configures a RR to accept all RTs.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family l2vpn evpn
device(config-bgp-evpn)# retain route-target all
```

## History

Release version	Command history
17r.1.01	This command was introduced.

# retransmit-interval

Sets the time the device waits before it retransmits Link State PDUs (LSPs).

## Syntax

**retransmit-interval** *interval*

**no retransmit-interval** *interval*

## Command Default

The default retransmission interval is 5 seconds.

## Parameters

*secs*

Specifies the retransmission interval in seconds. Valid values range from 1 through 65535 seconds. The default is 5 seconds.

## Modes

IS-IS router configuration mode

## Usage Guidelines

The **no** form of the command removes the configured interval.

## Examples

The following example changes the retransmission interval to 7 seconds.

```
device# configure terminal
device(config)# router isis
device(config-isis-router)# retransmit-interval 7
```

## History

Release version	Command history
16r.1.00	This command was introduced.

## retries

Configures the number of retries allowed to establish a connection with the Remote Authentication Dial-In User Service (RADIUS) server.

### Syntax

**retries** *num*

**no retries**

### Command Default

The number of retries allowed is 5.

### Parameters

*num*

Specifies the number of retries allowed to connect to a RADIUS server. The range is from 0 through 100. The default value is 5.

### Modes

RADIUS server host VRF configuration mode

### Usage Guidelines

The **no** form of the command restores the command default value.

### Examples

The following example shows how to set the number of retries allowed (to establish a connection with the RADIUS server) to 10.

```
device# configure terminal
device(config)# radius-server host 10.37.73.180 use-vrf green-vrf
device(config-host-10.37.73.180/green-vrf)# retries 10
```

### History

Release version	Command history
16r.1.00	This command was introduced.

## retry-limit

When the ingress LER fails to connect to the egress LER in a signaled LSP, the ingress LER tries indefinitely to make the connection unless the user sets a limit for these connection attempts. After this limit is exceeded, the ingress LER stops trying to connect to the egress LER over the primary path.

### Syntax

```
retry-limit { number }
no retry-limit
```

### Command Default

The command is disabled, by default.

### Parameters

*number*  
Specifies the LSP retry limit connection attempts.

### Modes

MPLS policy mode.

### Usage Guidelines

the no form of the command disables the configuration.

Once the connection is established, the retry counter is reset to zero.

### Examples

In the following example, when the LSP needs to be established again, the ingress LER makes 20 attempts to establish a connection to the egress LER.

```
device # configure
device(config)# router mpls
device(config-router-mpls)# policy
device(config-router-mpls-policy)# retry-limit 20
```

### History

Release version	Command history
16r.1.00	This command was introduced.

# retry-time

The user can configure the amount of time the ingress LER waits between connection attempts.

## Syntax

```
retry-time { seconds }
no retry-time
```

## Command Default

The command is disabled, by default.

## Parameters

*seconds*

Specifies the LSP retry time in seconds. The default is 30 seconds.

## Modes

MPLS policy mode.

## Usage Guidelines

When a signaled LSP is enabled, the ingress LER attempts to connect to the egress LER over the primary path specified in the LSPs configuration. When the connection is not successful, by default the ingress LER waits 30 seconds before attempting the connection again.

The **no** form of the command disables the configuration.

## Examples

The following example configures the retry time to 45 seconds.

```
device# configure
device(config)# router mpls
device(config-router-mpls)# policy
device(config-router-mpls-policy)# retry-time 45
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# reverse-metric

Configures the reverse metric value at the Intermediate System-to-Intermediate System (IS-IS) router level.

## Syntax

```
reverse-metric [ value ] [ te-def-metric ] [ whole-lan ]
```

```
reverse-metric tlv-type [ value ]
```

```
no reverse-metric [ value ] [ te-def-metric ] [ whole-lan ]
```

```
no reverse-metric tlv-type [ value ]
```

## Command Default

The **reverse-metric** command is disabled by default.

## Parameters

### reverse-metric

Specifies the reverse metric parameter at the IS-IS router level.

### *value*

Specifies the reverse metric value in metric style. The metric style consists of narrow or wide style. The narrow metric range is from 1 through 63. The wide metric range is from 1 through 16777215. The default value is 16777214 irrespective of the metric style configured.

### te-def-metric

Specifies that the device sends a traffic engineering (TE) default metric sub-type-length-value (TLV) within the reverse-metric TLV.

### whole-lan

Specifies that the configured reverse metric value affects the entire LAN.

### tlv-type *value*

Specifies the TLV type for the reverse metric value. The default value is 254.

## Modes

IS-IS router configuration mode

## Usage Guidelines

If the reverse-metric value is configured, the local LSP is updated with the sum of the default metric and the reverse metric value. When the IS-IS neighbor device receives the reverse metric value through the IS hello, the neighbor router updates the cost to reach the original IS-IS router with the sum of default metric and the reverse metric value.

The **whole-lan** option only takes effect on the multi-access LAN. IS-IS point-to-point interfaces are not affected when the **whole-lan** option is used.

The **no** form of the command specified with the configured value resets the metric value to the default value of 16777214. The **no reverse-metric** command removes the entire reverse metric configuration.

## Examples

The following example changes the reverse metric value for the entire LAN to 50.

```
device# configure terminal
device(config)# router isis
device(config-isis-router)# reverse-metric 50 whole-lan
```

The following example configures the reverse metric TLV type in the range of unassigned IS-IS TLV values.

```
device# configure terminal
device(config)# router isis
device(config-isis-router)# reverse-metric tlv-type 230
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# revert-timer

The path selection revert timer provides an option to stabilize a path before traffic is switched to it. Without a configured path selection revert timer, the router switches between a primary and secondary path immediately after the current working path goes down.

## Syntax

```
revert-timer { timer_value }
no revert-timer
```

## Command Default

There is no revert-timer in the default command mode.

## Parameters

*timer\_value*

The number of seconds that the router waits after the primary or selected path comes up before traffic reverts to that path. The range is 1- 65,535 seconds.

## Modes

MPLS LSP configuration mode (*config-router-mpls-lsp-lsp\_name*).

## Usage Guidelines

The **revert-timer** command has no effect on the unconditional select mode. Traffic is unconditionally switched to the user selected path and stays on it.

The path stability test used with the revert timer is based on the uptime of the latest instance of the path. This value can be different when the selected path has gone through a "make-before-break" procedure.

For an LSP going through re-optimization, the new LSP does not carry traffic until the revert timer expires.

When a user changes the revert timer, the basis of counting is the uptime of the path and is independent of the sequence or combination of configurations.

The **no** form of the command removes the revert-timer.

## Examples

The following example configures the revert-timer to 10 seconds.

```
device# configure
device(config)# router mpls
device(config-router-mpls)# lsp samplelsp
device(config-router-mpls-lsp-samplelsp)# revert-timer 10
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# revertive global

The revertive mode global command can be executed only on LSPs with FRR and adaptive enabled.

## Syntax

```
revertive global [ disable | enable ]  
no revertive mode global
```

## Command Default

Global revertiveness is enabled by default for LSPs with FRR and adaptive enabled.

## Parameters

**disable**  
Disables global revertiveness.

**enable**  
Enables global revertiveness.

## Modes

MPLS LSP Fast Reroute.

## Usage Guidelines

The **no** option disables global revertiveness on an LSP.

When adaptive is disabled, then global revertiveness is also disabled.

## Examples

The following example enables global revertiveness on LSP *t1*.

```
device# config  
device(config)# router mpls  
device(config-router-mpls)# lsp t1  
device(config-router-mpls-lsp-t1)# adaptive  
device(config-router-mpls-lsp-t1)# frr  
device(config-router-mpls-lsp-t1-frr)# revertive global enable
```

The following example is of an adaptive LSP.

```
device# configure terminal
device(config)# router mpls
device(config-mpls)# lsp t1
device(config-router-mpls-lsp-t1)# to 10.3.3.3
device(config-router-mpls-lsp-t1)# from 10.2.2.2
device(config-router-mpls-lsp-t1)# traffic-eng mean-rate 1000
device(config-router-mpls-lsp-t1)# adaptive
device(config-router-mpls-lsp-t1)# frr
device(config-router-mpls-lsp-t1-frr)# facility-backup
device(config-router-mpls-lsp-t1-frr)# exit
device(config-router-mpls-lsp-t1)# enable
device(config-router-mpls)#
```

The following example changes the FRR bandwidth for an adaptive LSP.

```
device(config)#
device(config)# router mpls
device(config-router-mpls)# lsp t1
device(config-router-mpls-lsp-t1)# frr
device(config-router-mpls-lsp-t1-frr)# bandwidth 1000
device(config-router-mpls-lsp-t1-frr)# exit
device(config-router-mpls-lsp-t1)# commit
```

The following example show how global revertiveness is enabled by default in FRR mode for an adaptive LSP.

```
device# configure
device(config)# router mpls
device(config-router-mpls)# policy
device(config-router-mpls-policy)# retry-limit 20
device(config-router-mpls-policy)# exit
device(config-router-mpls)# lsp t1
device(config-router-mpls-lsp-t1)# adaptive
device(config-router-mpls-lsp-t1)# frr
device(config-router-mpls-lsp-t1-frr)# revertive mode global
device(config-router-mpls-lsp-t1-frr)# revertive holdtime 20
device(config-router-mpls-lsp-t1-frr)# exit
device(config-router-mpls-lsp-t1)# commit
device(config-router-mpls-lsp-t1)#
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# revertive hold-time

Specifies the time, in seconds, the LSP holds before attempting a new path on the FRR LSP.

## Syntax

```
revertive holdtime { value }
```

```
no revertive holdtime
```

## Command Default

The default is five seconds.

## Parameters

*value*

Specifies the hold time value in seconds. The hold-time is the time between the primary LSP failure and the trigger of new instance of LSP by global revertiveness. The range is one through 60 seconds.

## Modes

MPLS LSP fast reroute mode (config-router-mpls-lsp-lsp\_name-frr).

## Usage Guidelines

The **no** form of the command removes the revertive hold time.

## Examples

The following example configures the revertive hold time to 20 seconds.

```
device# configure
device(Config)# router mpls
device(config-router-mpls)# lsp t1
device(config-router-mpls-lsp-t1)# adaptive
device(config-router-mpls-lsp-t1)# frr
device(config-router-mpls-lsp-t1-frr)# revertive mode global
device(config-router-mpls-lsp-t1-frr)# revertive holdtime 20
```

## History

Release version	Command history
16r.1.00	This command was introduced.

## revision

Assigns a version number to the Multiple Spanning Tree Protocol (MSTP) configuration.

## Syntax

**revision** *number*

**no revision**

## Command Default

The default is 0.

## Parameters

*number*

Specifies the revision or version number of the MSTP region. Valid values range from 0 through 255.

## Modes

]Spanning tree MSTP configuration mode

## Usage Guidelines

Enter **no revision** to return to the default setting.

## Examples

To set the configuration revision to 1:

```
device# configure terminal
device(config)# protocol spanning-tree mstp
device(conf-mstp)# revision 1
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# rfc1583-compatibility (OSPF)

Configures compatibility with RFC 1583.

## Syntax

```
rfc1583-compatibility
no rfc1583-compatibility
```

## Command Default

OSPF is compatible with RFC 1583 (OSPFv2).

## Modes

OSPF router configuration mode  
OSPF router VRF configuration mode

## Usage Guidelines

OSPF is compatible with RFC 1583 (OSPFv2) and maintains a single best route to an autonomous system (AS) boundary router in the OSPF routing table. Disabling this compatibility causes the OSPF routing table to maintain multiple intra-AS paths, which helps prevent routing loops.

Enter **no rfc1583-compatibility** to disable compatibility with RFC 1583.

## Examples

The following example disables compatibility with RFC 1583.

```
device# configure terminal
device(config)# router ospf
device(config-router-ospf-vrf-default-vrf)# no rfc1583-compatibility
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# rib-route-limit

Limits the maximum number of BGP Routing Information Base (RIB) routes that can be installed in the Routing Table Manager (RTM).

## Syntax

```
rib-route-limit num
```

```
no rib-route-limit
```

## Command Default

No maximum number of RIB routes is set.

## Parameters

*num*

Decimal value for the maximum number of RIB routes to be installed in the RTM. Valid values range from 1 through 4294967295.

## Modes

BGP address-family IPv4 unicast configuration mode

BGP address-family IPv6 unicast configuration mode

BGP address-family IPv4 unicast VRF configuration mode

BGP address-family IPv6 unicast VRF configuration mode

## Usage Guidelines

This command controls the number of routes installed by BGP, irrespective of whether those BGP routes are the preferred routes in the system. BGP locally tracks the number of routes installed and the number of routes withdrawn from RIB. If the total number of routes installed exceeds the value specified by *num*, routes will not be installed.

If *num* is increased, route calculation is automatically triggered.

If *num* is decreased, the user is prompted to clear the BGP RTM.

## Examples

The following example configures the device to limit the maximum number of BGP4 RIB routes that can be installed in the RTM.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv4 unicast
device(config-bgp-ipv4u)# rib-route-limit 10000
```

The following example configures the device to limit the maximum number of BGP4+ RIB routes that can be installed in the RTM.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv6 unicast
device(config-bgp-ipv6u)# rib-route-limit 32000
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# rmon alarm

Sets the RMON alarm conditions.

## Syntax

```
rmon alarm index snmp_oid interval seconds [ absolute | delta ] rising-threshold value event number [ falling-threshold value
event number [ owner name ]
```

```
no rmon alarm
```

## Command Default

No alarms are configured.

## Parameters

*index*

Specifies the RMON alarm index. Valid values range from 1 through 65535.

*snmp\_oid*

Specifies the MIB object to monitor. The variable must be in the SNMP OID format, for example, 1.3.6.1.2.1.16.1.1.1.5.65535. The object type must be a counter32.

**interval** *seconds*

Specifies the RMON alarm sample interval in seconds. Valid values range from 1 through 2147483648.

**absolute**

Sets the sample type as absolute.

**delta**

Sets the sample type as delta.

**rising-threshold** *value*

Specifies the RMON alarm rising threshold. Valid values range from 0 through 4294967295.

**event** *number*

Specifies the event for the rising alarm. Valid values range from 1 through 65535.

**falling-threshold** *value*

Specifies the RMON alarm falling threshold. Valid values range from 0 through 4294967295.

**event** *number*

Specifies the event for the rising alarm. Valid values range from 1 through 65535.

**owner** *name*

Specifies the identity of the owner. The maximum number of characters is 32.

## Modes

Global configuration mode

## Usage Guidelines

Enter **no rmon alarm** to disable the alarm conditions.

## Examples

To set RMON alarm conditions:

```
device# configure terminal
device(config)# rmon alarm 100 1.3.6.1.2.1.16.1.1.1.5.65535 interval 5 absolute rising-threshold 10000
event 100 falling-threshold 1000 event 101 owner admin
```

# rmon collection history

Collects Ethernet group statistics for later retrieval.

## Syntax

**rmon collection history** *number* [ **buckets** *bucket\_number* | **interval** *seconds* | **owner** *name* ]

**no rmon collection history** *number*

## Command Default

RMON history collection is not enabled.

## Parameters

*number*

Specifies the RMON collection control index value. Valid values range from 1 through 65535.

**buckets** *bucket\_number*

Specifies the maximum number of buckets for the RMON collection history. Valid values range from 1 through 65535.

**interval** *seconds*

Specifies the alarm sample interval in seconds. Valid values range from 1 through 3600. The default value is 1800.

**owner** *name*

Specifies the identity of the owner. The maximum number of characters is 15.

## Modes

Interface subtype configuration mode

## Usage Guidelines

This command collects periodic statistical samples of Ethernet group statistics on a specific interface for later retrieval.

Enter **no rmon collection history** *number* to disable the history of statistics collection.

## Examples

To collect RMON statistics, with an RMON collection control index value of 5 for the owner named admin, on a specific Ethernet interface:

```
device# configure terminal
device(config)# interface ethernet 1/6
device(conf-if-eth-1/6)# rmon collection history 5 owner admin
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# rmon collection stats

Collects Ethernet group statistics on a specific interface.

## Syntax

**rmon collection stats** *number* [ **owner name** ]

**no rmon collection stats** *number*

## Command Default

RMON statistic collection is not enabled.

## Parameters

*number*

Specifies the RMON collection control index value. Valid values range from 1 through 65535.

**owner name**

Specifies the identity of the owner.

## Modes

Interface subtype configuration mode

## Usage Guidelines

Enter **no rmon collection stats** *number* to disable the collection of statistics.

Ethernet group statistics collection is not supported on ISL links.

## Examples

The following example shows how to collect RMON statistics, with an RMON collection control index value of 2 for the owner named admin, on a specific Ethernet interface:

```
device# configure terminal
device(config)# interface ethernet 1/6
device(conf-if-eth-1/6)# rmon collection stats 2 owner admin
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# rmon event

Adds or removes an event in the RMON event table associated to the RMON alarm number.

## Syntax

```
rmon event index [ description word | log | owner name | trap word ]  
no rmon event
```

## Command Default

No events are configured.

## Parameters

*index*  
Specifies the RMON event number. Valid values range from 1 through 65535.

*description word*  
Specifies a description of the event.

log  
Generates an RMON log when an event is triggered.

*owner name*  
Specifies the owner of the event. The *name* string must be between 1 and 32 characters in length.

*trap word*  
Specifies the SNMP community or string name to identify this trap.

## Modes

Global configuration mode

## Usage Guidelines

Enter **no rmon event** to remove the event configuration.

## Examples

To configure an RMON event:

```
device# configure terminal  
device(config)# rmon event 2 log description "My Errorstoday" owner gjack
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# role name

Creates or modifies a non-default role.

## Syntax

**role name** *role\_name* [ **desc** *description* ]

**no role name** *role\_name* [ **desc** *description* ]

## Parameters

*role\_name*

Specifies the name of the role.

**desc** *description*

Specifies an optional role description.

## Modes

Global configuration mode

## Usage Guidelines

For each role that you create, you define one or more rules. Each user is associated with one—and only one—role.

Role names are from 4 through 32 characters, must begin with a letter, and can contain alphanumeric characters and underscores. The name cannot be same as that of an existing user.

The description field supports up to 64 characters and can include any printable ASCII character, except for the following characters: single quotation mark ('), double quotation mark ("), exclamation point (!), colon (:), and semi-colon (;). If the description contains spaces, enclose the text in double quotation marks.

The maximum number of roles supported is 64, including the user and admin default roles.

To delete a role description, enter **no role name** *role\_name* **desc**.

To delete a role, enter **no role name** *role\_name*.

## Examples

The following example creates a role.

```
device# configure terminal
device(config)# role name tempAdmin desc "Daily admin functions"
```

The following example deletes the role.

```
device# configure terminal
device(config)# no role name tempAdmin
```

role name

## History

Release version	Command history
16r.1.00	This command was introduced.

# root access console

Restricts the root access to the device to the console only.

## Syntax

`root access console`

`no root access console`

## Modes

Global configuration mode

## Usage Guidelines

The `no root access console` allows root access to the device through all terminals (SSH, Telnet, and console).

## Examples

Typical command output:

```
device# configure terminal
device(config)# do show running-config | include root
% No entries found.
device(config)# root access console
device(config)# do show running-config | include root
root access console
device(config)#
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# root enable

Enables root access to the device following a firmware configuration.

## Syntax

root enable

no root enable

## Modes

Global configuration mode

## Usage Guidelines

The **no root enable** command disables root access to the device.

## Examples

Typical command output:

```
device# configure terminal
device(config)# do show running-config | include root
% No entries found.
device(config)# root enable
% Info: Root password is at system default, for better security, you may want to change it.
device(config)# do show running-config | include root
root enable
device(config)#
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# router bgp

Enables BGP routing.

## Syntax

```
router bgp
```

```
no router bgp
```

## Command Default

BGP routing is not enabled.

## Modes

Global configuration mode

## Usage Guidelines

The **no** form of the command disables BGP routing.

## Examples

The following example enables BGP routing.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)#
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# route-map (default system-mode)

Creates a route map; for an existing route map, adds a stanza.

## Syntax

```
route-map name { permit | deny } stanza
```

```
no route-map name { permit | deny } stanza
```

## Parameters

*name*

Specifies the name of the route map. The string must be between 1 and 63 ASCII characters in length.

**permit**

Allows a matching pattern.

**deny**

Disallows a matching pattern.

*stanza*

Specifies the stanza ID. Valid values range from 1 through 65535.

## Modes

Global configuration mode

## Usage Guidelines

This command is used in conjunction with the **match** and **set** commands.

The **continue** command configures the route map to continue to evaluate and execute match statements after a successful match occurs. The **continue** statement proceeds to the route map with the specified sequence number. If no sequence number is specified, the statement proceeds to the route map with the next sequence number (as an "implied" continue).

The **no** form of this command deletes a route-map stanza.

## Examples

The following example configures a route map that allows a matching pattern.

```
device# configure terminal
device(config)# route-map test permit 5
```



The following example configures continue statements in a route map.

```
device# configure terminal
device(config)# route-map mcontroutemap1 permit 1
device(config-route-map-mycontroutemap/permit/1)# match metric 10
device(config-route-map-mycontroutemap/permit/1)# set weight 10
device(config-route-map-mycontroutemap/permit/1)# match metric 10
device(config-route-map-mycontroutemap/permit/1)# continue 2
device(config-route-map-mycontroutemap/permit/1)# route-map mcontroutemap1 permit 2
device(config-route-map-mycontroutemap/permit/2)# match tag 10
device(config-route-map-mycontroutemap/permit/2)# set weight 20
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# route-only

Configures VE route-only mode on physical ports and port-channels (LAG ports), to enable the exclusive IP routing of incoming packets. Incoming switching packets on the port are dropped, and outgoing switching packets are forwarded.

## Syntax

```
route-only
no route-only
```

## Command Default

This feature is disabled.

## Modes

Interface subtype configuration mode

## Usage Guidelines

Use the **no** form of this command to disable this feature.

## Examples

To configure VE route-only mode on a physical port.

```
device# configure terminal
device(config)# interface ethernet 1/2
device(conf-if-eth-1/2)# switchport
device(conf-if-eth-1/2)# switchport mode trunk
device(conf-if-eth-1/2)# switchport mode trunk allowed vlan add 100
device(conf-if-eth-1/2)# route-only
device(conf-if-eth-1/2)# no shutdown
```

To disable VE route-only mode on a physical port.

```
device# configure terminal
device(config)# interface ethernet 1/2
device(conf-if-eth-1/2)# no route-only
```

To configure VE route-only mode on a LAG port:

```
device# configure terminal
device(config)# interface port-channel 1
device(config-Port-channel-1)# switchport
device(config-Port-channel-1)# switchport mode trunk
device(config-Port-channel-1)# switchport mode trunk allowed vlan add 100,200
device(config-Port-channel-1)# switchport trunk tag native-vlan
device(config-Port-channel-1)# route only
device(config-Port-channel-1)# no shutdown
```

To disable VE route-only mode on a LAG port:

```
device# configure terminal
device(config)# interface port-channel 1
device(config-Port-channel-1)# no route-only
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# router-interface

Configures the router interface for a tunnel .

## Syntax

```
router-interface ve num
no router-interface
```

## Command Default

A router interface is not configured.

## Parameters

**ve *num***  
Specifies a virtual router interface number.

## Modes

Tunnel interface configuration mode

## Usage Guidelines

The **no** form of the command removes the router interface from the VE interface.

## Examples

The following example shows how to attach the router interface to a VE interface.

```
device# configure terminal
device(config)# interface tunnel 5
device(config-intf-tunnel-5)# mode gre ip
device(config-intf-tunnel-5)# source 10.1.1.10
device(config-intf-tunnel-5)# source ve 4
device(config-intf-tunnel-5)# destination 10.1.1.11
device(config-intf-tunnel-5)# router-interface ve 3
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# router isis

Enables Intermediate System-to-Intermediate System (IS-IS) routing.

## Syntax

**router isis**

**no router isis**

## Command Default

Disabled

## Modes

Global configuration mode

## Usage Guidelines

The **no** form of the command disables IS-IS routing.

## Examples

The following example enables IS-IS routing.

```
device# configure terminal
device(config)# router isis
device(config-isis-router)#
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# router mpls

Enables MPLS and accesses MPLS configuration mode

## Syntax

`router mpls`

`no router mpls`

## Command Default

MPLS is disabled by default.

## Modes

Global configuration mode

## Usage Guidelines

Use the **no** form of this command to disable MPLS on the device.

## Examples

The following example enables MPLS on the device and access MPLS configuration mode.

```
device# configure terminal
device(config)# router mpls
device(config-router-mpls)#
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# router ospf

Enables and configures the Open Shortest Path First version 2 (OSPFv2) routing protocol.

## Syntax

```
router ospf [ vrf name ]
no router ospf
```

## Parameters

**vrf name**  
Specifies a nondefault VRF.

## Modes

Global configuration mode

## Usage Guidelines

Use this command to enable the OSPFv2 routing protocol and enter OSPF router or OSPF router VRF configuration mode. OSPFv2 maintains multiple instances of the routing protocol to exchange route information among various VRF instances.

The **no** form of the command deletes all current OSPF configuration and blocks any further OSPFv2 configuration.

## Examples

The following example enables OSPFv2 on a default VRF and enters OSPF VRF router configuration mode.

```
device# configure terminal
device(config)# router ospf
device(config-router-ospf-vrf-default-vrf)
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# router pim

Configures basic global protocol-independent multicast (PIM) Sparse parameters on a device within the PIM Sparse domain and enters PIM-router configuration mode.

## Syntax

```
router pim
no router pim
```

## Command Default

PIM Sparse is not configured.

## Modes

Global configuration mode

## Usage Guidelines

The **no** form of this command disables PIM and removes all configuration for PIM multicast on the device (**router pim** level) only.

You do not need to globally enable IP multicast routing when configuring PIM Sparse.

After you enable IP multicast routing and PIM Sparse at the global level, you must enable it on the individual interfaces connected to the PIM Sparse network.

If you configure PIM Sparse on an interface that is on the border of the PIM Sparse domain, you also must also configure the **ip pim border** command on the interface.

You must configure the **bsr-candidate ethernet** command to identify an interface on at least one device as a candidate PIM Sparse Bootstrap router (BSR) and candidate PIM Sparse Rendezvous Point (RP).

You can configure the **rp-address** command to explicitly identify an RP, including an ACL-based RP, by its IP address instead of having it identified by the RP election process.

## Examples

This example configures basic global PIM Sparse parameters.

```
device(config)# router pim
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# route-precedence

Configures a table that defines the order (precedence) in which multicast routes are selected from the multicast routing table (mRTM) and unicast routing (uRTM) table.

## Syntax

```
route-precedence { [ none | uc-default |uc-non-default ] | [ uc-default | none |uc-non-default ] | [ uc-non-default | none |uc-
default ] }
```

```
no route-precedence
```

## Command Default

The default route precedence used to select routes is **uc-non-default** followed by **uc-default**.

## Parameters

### none

Specifies that this type of route is to be ignored. You can specify this option for any of the multicast or unicast route types.

### uc-non-default

Specifies the precedence for the non-default unicast route table (uRTM).

### uc-default

Specifies the precedence for the default unicast route table (uRTM).

## Modes

Router PIM configuration mode

## Usage Guidelines

The order in which you place the keywords determines the route precedence.

The **no** form of this command restores the default route precedence settings.

## Examples

The following example configures the route precedence.

```
device(config)# router pim
device(config-pim-router)# route-precedence uc-default uc-non-default none
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# route-target

Configures route-target for distribution of routes between VPN routing tables.

## Syntax

```
route-target { import | export | both } ASN-nn
```

```
no route-target
```

## Parameters

**import**

Specifies export.

**export**

Specifies export.

**both**

Specifies both export and import.

*ASN-*nn**

Composed of the local ASN number followed by a colon ":" and a unique arbitrary number. For example 3:6.

## Modes

VRF configuration mode

## Usage Guidelines

The **no** form of the command to delete configuration for the route-target for distribution.

## Examples

The following example shows how to configures route-target for distribution of routes between VPN routing tables.

```
device# configure terminal
device(config)# vrf vpn1
device#(config-vrf-vpn1)# rd1 1:2
device#(config-vrf-vpn1)# vpn-statistics
device#(config-vrf-vpn1)# address-familin ipv4 unicast
device#(config-vrf-vpn1-ipv4-unicast)# route-target-import 100:1
device#(config-vrf-vpn1-ipv4-unicast)# route-target-export 100:1
```

## History

Release version	Command history
17r.1.01	This command was introduced.

# route-target (EVPN default instance)

Enables auto-generation of the import and export route-target community attributes for an Ethernet Virtual Private Network (EVPN) default instance.

## Syntax

```
route-target { both | import } auto [ ignore-as ]
route-target export auto
no route-target { both | import } auto [ ignore-as ]
no route-target export auto
```

## Command Default

Disabled.

## Parameters

### **both auto**

Specifies auto-generation of the import and export route-target community attributes.

### **ignore-as**

Specifies that the autonomous system (AS) number be ignored.

### **export auto**

Specifies auto-generation of the export route-target community attribute.

### **import auto**

Specifies auto-generation of the import route-target community attribute.

## Modes

EVPN default instance configuration mode

## Usage Guidelines

The **no** form of this command removes configured route target parameters.

## Examples

The following example configures auto-generation of the import and export route-target community attributes for EVPN instance "myinstance".

```
device# configure terminal
device(config)# evpn
device(config-evpn-default)# route-target both auto
```

The following example configures auto-generation of the import route-target community attribute and specifies that the AS path be ignored to the route for EVPN instance "myinstance".

```
device# configure terminal
device(config)# evpn
device(config-evpn-default)# route-target import auto ignore-as
```

The following example configures auto-generation of the export route-target community attribute for EVPN instance "myinstance".

```
device# configure terminal
device(config)# evpn
device(config-evpn-default)# route-target export auto
```

## History

Release version	Command history
17r.1.01	This command was introduced.

# route-target (EVPN VLAN/BD)

Enables auto-generation of the import and export route-target community attributes for a VLAN/bridge domain (BD) in an Ethernet Virtual Private Network (EVPN) default instance.

## Syntax

```
route-target { both | import } auto [ admin-value:arbitrary-value ]
```

```
route-target export auto [ admin-value:arbitrary-value ]
```

```
no route-target { both | import } auto [ ignore-as ]
```

```
no route-target export auto
```

## Command Default

Disabled.

## Parameters

### **both auto**

Specifies auto-generation of the import and export route-target community attributes.

### **export auto**

Specifies auto-generation of the export route-target community attribute.

### **import auto**

Specifies auto-generation of the import route-target community attribute.

### *admin-value*

The administrative number assigned to the route. This can be a local ASN number or an IP address. The ASN number can be either a 2-byte number (from 0 through 65535) or a 4-byte number (from 0 through 4294967295).

### *arbitrary-value*

An arbitrary number you choose. The range of valid values is from 0 through 65535 if the ASN is an IP address or a 2 byte ASN. The range is 0 through 4294967295 if the ASN is a 4 byte ASN.

## Modes

EVPN VLAN/BD configuration mode

## Usage Guidelines

The **no** form of this command removes configured route target parameters.

## Examples

The following example configures auto-generation of the import and export route-target community attributes for EVPN VLAN/BD 200.

```
device# configure terminal
device(config)# evpn
device(config-evpn-default)# bridge-domain 200
device(config-bridge-domain-200)# route-target both 200:1
```

## History

Release version	Command history
17r.1.01	This command was introduced.

# rp-address

Configures a device interface as a rendezvous point (RP).

## Syntax

```
rp-address ip-address
```

```
no rp-address ip-address
```

## Command Default

The RP is selected by the PIM Sparse protocol's RP election process.

## Parameters

*ip-address*

Specifies the IPv4 address of the RP.

## Modes

Router PIM configuration mode

## Usage Guidelines

The **no** form of this command restores the default and the RP is selected by the RP election process.

Devices in the PIM Sparse domain use the specified RP and ignore group-to-RP mappings received from the bootstrap router (BSR).

The RP is the meeting point for PIM Sparse sources and receivers. A PIM Sparse domain can have multiple RPs, but each PIM Sparse multicast group address can have only one active RP. PIM Sparse routers learn the addresses of RPs and the groups for which they are responsible from messages that the BSR sends to each of the PIM Sparse routers.

## Examples

This example configures the device interface at IP address 4.4.4.4 as the RP for the PIM Sparse domain. The default group range is 224/4.

```
device(config)# router pim
device(config-pim-router)# rp-address 4.4.4.4
```

This example configures the RP with specific group ranges:

```
device(config)# router pim
device(config-pim-router)# rp-address 4.4.4.4 static-rp-plist
device(config)# ip prefix-list static-rp-plist permit 225.1.1.0/24
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# rp-candidate

Configures a device as a candidate rendezvous point (RP) for all multicast groups with the prefix 224.0.0.0/4, by default, and explicitly adds or deletes groups with other prefixes.

## Syntax

```
rp-candidate [ interface interface type | prefix IP prefix-list name ]
```

## Command Default

The PIM router is not available for selection as an RP.

## Parameters

**interface** *interface type*

Specifies an interface for the candidate RP. Interface types include ethernet, loopback, port-channel, and Ve.

**prefix** *IP prefix list name*

Specifies the IP prefix list name.

## Modes

Router PIM configuration mode

## Usage Guidelines

The **no rp-candidate** command makes the PIM router cease to act as a candidate RP.

Configuring the **rp-candidate** command on an Ethernet, loopback, virtual, or tunnel interface, configures the device as a candidate RP for all multicast groups with the prefix 224.0.0.0/4, by default. You can configure the **rp-candidate add** command to add to those a group address or range of group addresses. You can configure the **rp-candidate delete** command to delete a group address or range of group addresses that were added to the default addresses.

### NOTE

You cannot delete the default group prefix.

The RP is the meeting point for PIM Sparse sources and receivers. A PIM Sparse domain can have multiple RPs, but each PIM Sparse multicast group address can have only one active RP. PIM Sparse routers learn the addresses of RPs and the groups for which they are responsible from messages that the bootstrap router (BSR) sends to each of the PIM Sparse routers.

Although you can configure the device as only a candidate BSR or an RP, it is recommended that you configure the same interface on the same device as both a BSR and an RP.

## Examples

This example configures a physical device as a candidate RP.

```
device(config)# router pim
device(config-pim-router)# rp-candidate ethernet 1/1
```

This example configures a loopback interface as a candidate RP:

```
device(config-pim-router)# rp-candidate interface loopback 11
device(config-pim-router)# rp-candidate prefix my-rp-cand-list
device(config)# ip prefix-list my-rp-cand-list permit 226.1.1.0/24
device(config)# ip prefix-list my-rp-cand-list permit 228.1.1.0/24
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# rpf ecmp rebalance

Enables multicast ECMP load sharing with dynamic rebalancing.

## Syntax

```
rpf ecmp rebalance
```

```
no rpf ecmp rebalance
```

## Modes

Router PIM configuration mode

## Usage Guidelines

Once you configure ECMP rebalance the existing flows are redistributed among the all available ECMP paths. In addition, whenever a new next-hop is added, some of the existing flows are redistributed to the new path added using the newly added ECMP path.

## Examples

The following example enables multicast ECMP load sharing with dynamic rebalancing.

```
device(config)# router pim
devic(config-pim-router)# rpf ecmp rebalance
```

## History

Release version	Command history
16r.1.00	This command was introduced.

## rsvp

Accesses MPLS RSVP configuration mode to configure RSVP-TE Hello.

## Syntax

```
rsvp
no rsvp
```

## Command Default

None

## Modes

MPLS configuration mode  
MPLS interface configuration mode

## Examples

The following example accesses MPLS RSVP configuration mode to configure RSVP-TE Hello globally.

```
device# configure terminal
device(config)# router mpls
device(config-router-mpls)# rsvp
device(config-router-mpls-rsvp)#
```

The following example accesses MPLS RSVP configuration mode to configure RSVP-TE Hello on an MPLS interface.

```
device# configure terminal
device(config)# router mpls
device(config-router-mpls)# mpls-interface ethernet 1/12
device(config-router-mpls-interface-1/12)# rsvp
device(config-router-mpls-interface-1/12-rsvp)#
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# rsvp-flooding-threshold

The **rsvp-flooding-threshold** command can be executed multiple times for the same interface. The threshold values are added to the existing set of values for the interface.

## Syntax

```
rsvp-flooding-threshold [ down | up ] percent *
no rsvp-flooding-threshold [ down | up ] percent *
```

## Command Default

The command is disabled, by default.

## Parameters

### down percent\*

The down option sets the thresholds for decreased resource availability. Valid values are from 0 to 99. The default values for down is 100, 99, 98, 97, 96, 95, 90, 85, 80, 75, 60, 45, 30, 15.

The "\*" represents multiple percent values can be given. A minimum one percentage value is required.

### up percent\*

The up option sets the thresholds for increased resource availability. Valid values are from 1 to 100. The default values for up is 15, 30, 45, 60, 75, 80, 85, 90, 95, 97, 98, 99, 100.

The "\*" represents multiple percent values can be given. A minimum one percentage value is required.

## Modes

MPLS policy mode.

## Usage Guidelines

The **no** form of the command removes the RSVP TE flooding threshold configuration.

Previously configured values are not overwritten. The interface specific configuration overrides the global configuration.

## Examples

In the following example, the UP thresholds contain 10, 50, 55, 95, 96, 97, 98, and 100. The DOWN thresholds contain 50, 40, 30, 20, and 10.

```
device# configure
device(config)# router mpls
device(config-router-mpls)# mpls-interface ethernet 1/1
device(config-router-mpls-if-eth-1/1)# rsvp-flooding-threshold up 10 50 55 95
device(config-router-mpls-if-eth-1/1)# rsvp-flooding-threshold up 96 97 98 99 100
device(config-router-mpls-if-eth-1/1)# rsvp-flooding-threshold down 50 40
device(config-router-mpls-if-eth-1/1)# rsvp-flooding-threshold down 30 20 10
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# rsvp-periodic-flooding-time

Sets the interval for RSVP-TE periodic flooding.

## Syntax

```
rsvp-periodic-flooding-time { interval }
no rsvp-periodic-flooding-time
```

## Command Default

All MPLS interfaces are checked every three minutes by default. The length of interval value is set to zero.

## Parameters

*interval*

Specifies the length of interval used for periodic flooding (in seconds). Valid range is zero, 30–3600. For value zero, periodic flooding is turned off.

## Modes

MPLS policy mode.

## Usage Guidelines

TE advertisements are triggered when there is a difference in the available bandwidth and advertised available bandwidth.

The **no** form of the command can be used to set the periodic flooding timer to default value.

## Examples

The following example sets the interval as 240, which triggers periodic flooding every four minutes.

```
device# configure
device(config)# router mpls
device(config-router-mpls)# policy
device(config-router-mpls-policy)# rsvp-periodic-flooding-time 240
device(config-router-mpls-policy)# no rsvp-periodic-flooding-time
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# rule

Creates role-based access permissions (RBAC) associated with a role.

## Syntax

```
rule index [ action { accept | reject } ] [ operation { read-only | read-write } ] role role_name command command_name
no rule index
```

## Command Default

The default for **action** is **accept**. The default for **operation** is **read-write**.

## Parameters

*index*

Specifies a numeric identifier for the rule. Valid values range from 1 through 512.

**action** **accept** | **reject**

(Optional) Specifies whether the user is accepted or rejected while attempting to execute the specified command. The default value is **accept**.

**operation** **read-only** | **read-write**

(Optional) Specifies the type of operation permitted. The default value is **read-write**.

**role** *role\_name*

Specifies the name of the role for which the rule is defined.

**command** *command\_name*

Specifies the command for which access is defined. Separate commands with a space. To display a list of supported commands, type a question mark (?).

## Modes

Global configuration mode

## Usage Guidelines

For each role that you create, you define one or more rules. Each account is associated with one—and only one—role.

When you create a rule, the *index*, **role**, and **command** operands are mandatory; the **action** and **operation** operands are optional.

The maximum number of rules is 512.

When you modify a rule, all operands except *index* and **role** are optional.

Enter **no rule** *index* to remove the specified rule.



## Examples

The following example creates rules enabling the NetworkSecurityAdmin role to create user accounts.

```
device# configure terminal
device(config)# rule 150 action accept operation read-write role NetworkSecurityAdmin command config
device(config)# rule 155 action accept operation read-write role NetworkSecurityAdmin command username
```

The following example deletes a rule.

```
device# configure terminal
device(config)# no rule 155
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# rx-label-silence-time

Defines the length of the receive label silence timer for for LDP-IGP synchronization.

## Syntax

**rx-label-silence-time** *milliseconds*

**no rx-label-silence-time**

## Command Default

The default value is 1000 milliseconds.

## Parameters

*milliseconds*

Specifies the length of time in milliseconds of the receive label silence timer. Enter an integer from 100 to 60000.

## Modes

MPLS LDP configuration mode

## Usage Guidelines

Use the **no** form of the command to reset the default value of 1000 milliseconds.

When labels are not received from the peer for a short period of time, the session is declared In Sync. When a label is received from a peer, then the receive label silence timer is reset.

## Examples

The following example sets the length of time for the receive label silence timer to 80000 milliseconds.

```
device(conf)# router mpls
device(config-mpls)# ldp
device(config-router-mpls-ldp)# rx-label-silence-time 80000
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# sample-recording

Configures the template to record the sample history.

## Syntax

```
sample-recording [ disable | enable ]
no sample-recording
```

## Command Default

The command is disabled by default.

## Parameters

### disable

Removes the setting for the sample recording for the selected LSP or autobw-template.

### enable

Sets the sample recording for ththe selected LSP or autobw-template.

## Modes

MPLS sub-configuration modes.

```
config-router-mpls-autobw-template-template1
```

```
config-router-mpls-lsp-lsp1
```

## Usage Guidelines

The **no** function of the command disables the option..

## Examples

The following example shows a configuration to record the sample history for *template1*.

```
device>configure
device(config)# router mpls
device(config-router-mpls)# autobw
device(config-router-mpls-autobw)# template template1
device(config-router-mpls-autobw-template-template1)# sample-recording enable
```

The following example shows a configuration to stop recording sample history for *LSP1*.

```
device>configure
device(config)# router mpls
device(config-router-mpls)# lsp lsp1
device(config-router-mpls-lsp-lsp1)# autobw
device(config-router-mpls-lsp-lsp1-autobw)# sample-recording disable
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# scheduler

Configures the strict priority queues on an interface for QoS egress scheduling.

## Syntax

**scheduler strict-priority** *traffic-class-queues* **drrr** *TC0-BW% TC1-BW% TC2-BW% TC3-BW% TC4-BW% TC5-BW% TC6-BW% TC7-BW%*

**no scheduler strict-priority**

## Parameters

*traffic-class-queues*

Specifies the traffic class strict priority queues. Enter one of the following integers:

- 0—No strict priority queues
- 1—Traffic class 7 strict priority queue
- 2—Traffic class 6 through 7 strict priority queues
- 3—Traffic class 5 through 7 strict priority queues
- 4—Traffic class 4 through 7 strict priority queues
- 5—Traffic class 3 through 7 strict priority queues
- 6—Traffic class 2 through 7 strict priority queues
- 7—Traffic class 1 through 7 strict priority queues

**drrr** *TC0-BW% TC1-BW% TC2-BW% TC3-BW% TC4-BW% TC5-BW% TC6-BW% TC7-BW%*

Configures the Deficit Weighted Round Robin queues in percentage for each traffic class, if the priority is in weighted fair queue (WFQ) mode. Enter an integer from 0 through 100 (*TC0-BW* for traffic class 0 through *TC7-BW* for traffic class 7). The total of all values must equal 100%.

## Modes

Policy-map configuration mode

## Usage Guidelines

This command is allowed only for the egress direction.

Use the **no** form of this command to remove QoS egress scheduling from the interface.

## Examples

The following example configures QoS egress scheduling on an interface.

```
device# configure terminal
device(config)# policy-map policy_1
device(config-policymap)# class default
device(config-policymap-class)# scheduler strict-priority 1 drrr 25 25 25 10 5 5 5
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# seq (rules in IPv4 extended ACLs)

Inserts filtering rules in IPv4 extended ACLs. Extended ACLs permit or deny traffic according to source and destination addresses, as well as other parameters.

## Syntax

```
seq seq-value { permit | deny | hard-drop } ip-protocol { S_IPAddress mask | host S_IPAddress | any } [ source-operator [ S_port-numbers ] ] { D_IPAddress mask | host D_IPAddress | any } [ dscp DSCPvalue ] [ destination-operator [ D_port-numbers ] ] [ TCP-flags ] [ vlan vlanID ] [ count ] [ log ] [ mirror ] [ copy-sflow ]
```

```
no seq seq-value
```

```
{ permit | deny | hard-drop } ip-protocol { S_IPAddress mask | host S_IPAddress | any } [ source-operator [ S_port-numbers ] ] { D_IPAddress mask | host D_IPAddress | any } [ dscp DSCPvalue ] [ destination-operator [ D_port-numbers ] ] [ TCP-flags ] [ count ] [ vlan vlanID ] [ log ] [ mirror ] [ copy-sflow ]
```

```
no { permit | deny | hard-drop } ip-protocol { S_IPAddress mask | host S_IPAddress | any } [ source-operator [ S_port-numbers ] ] { D_IPAddress mask | host D_IPAddress | any } [ dscp DSCPvalue ] [ destination-operator [ D_port-numbers ] ] [ TCP-flags ] [ vlan vlanID ] [ count ] [ log ] [ mirror ] [ copy-sflow ]
```

## Parameters

### seq

(Optional) Enables you to assign a sequence number to the rule. If you do not specify **seq seq-value**, the rule is added at the end of the list.

*seq-value*

Valid values range from 1 through 65535.

### permit

Specifies rules to permit traffic.

### deny

Specifies rules to deny traffic.

### hard-drop

Overrides the trap behavior for control frames. However, **hard-drop** does not override a **permit** for this address in a preceding rule.

### ip-protocol

Indicates the type of IP packet you are filtering. The options are as follows:

<0-255>

Protocol number custom value from 0 through 255.

### icmp

Internet Control Message Protocol

### ip

Any IP protocol

### tcp

(Supported only if the containing ACL is applied to incoming traffic) Transmission Control Protocol

**udp**

User Datagram Protocol

*S\_IPAddress*

Specifies a source address for which you want to filter the subnet.

*mask*

Defines a mask, whose effect is to specify a subnet that includes the source address that you specified. For options to specify the mask, see the Usage Guidelines.

**host**

Specifies a source address.

*S\_IPAddress*

The source address.

**any**

Specifies all source addresses.

*source-operator* and *destination-operator*

If you specified **tcp** or **udp** *ip-protocol*, the following optional operators are available:

**eq**

The policy applies to the TCP or UDP port name or number you enter after **eq**.

**gt**

The policy applies to TCP or UDP port numbers equal to or greater than the port number or the numeric equivalent of the port name you enter after **gt**.

**lt**

The policy applies to TCP or UDP port numbers that are equal to or less than the port number or the numeric equivalent of the port name you enter after **lt**.

**neq**

The policy applies to all TCP or UDP port numbers except the port number or port name you enter after **neq**.

**range**

The policy applies to all TCP or UDP port numbers that are between the first TCP or UDP port name or number and the second one you enter following the **range** keyword. The range includes the port names or numbers you enter. For example, to apply the policy to all ports between and including 23 (Telnet) and 53 (DNS), enter the following: **range 23 53** (two values separated by a space). The first port number in the range must be lower than the last number in the range.

*S\_port-numbers* and *D\_port\_numbers*

(Valid only when *ip-protocol* is UDP or TCP) Specifies one or more source or destination port numbers.

*D\_IPAddress*

Specifies a destination address for which you want to filter the sub-net.

*mask*

Defines a mask, whose effect is to specify a subnet that includes the destination address that you specified. For options to specify the mask, see the Usage Guidelines.

**host**

Specifies a destination address.

*D\_IPAddress*

The destination address.



- any**  
Specifies all destination addresses.
- dscp**  
Matches *DSCPvalue* against the DSCP value of the packet.  
*DSCPvalue*  
From 0 through 63.
- dscp-force**  
(In **permit** rules, for incoming routed packets) Forces the outgoing DSCP value of packets that match the filter.
- drop-precedence-force *dp-value***  
(Currently not supported) (In **permit** rules for incoming traffic) Sets the force drop precedence by the specified value.
- vlan *vlanID***  
Specifies a VLAN interface to which the ACL is bound.
- TCP-flags*  
If you specify **tcp *ip-protocol***, one or more of the following flags are available:
- ack**  
Filters packets for which the **ack** (acknowledge) flag is set.
- fin**  
Filters packets for which the **fin** (finish) flag is set.
- rst**  
Filters packets for which the **rst** (reset) flag is set.
- sync**  
Filters packets for which the **syn** (synchronize) flag is set.
- urg**  
Filters packets for which the **urg** (urgent) flag is set.
- push**  
Filters packets for which the **psh** (push) flag is set.
- count**  
Enables statistics for the rule.
- log**  
Enables inbound logging for the rule. In addition, the ACL log buffer must be enabled, using the **debug access-list-log buffer** command.
- mirror**  
(Supported for rules in ACLs applied on physical interfaces to inbound traffic. Not supported for PBR, rACLs, or ACL-RL.) Mirrors packets matching the rule.
- copy-sflow**  
Sends matching inbound packets to the sFlow collector.

## Modes

ACL configuration mode

## Usage Guidelines

The order of the rules in an ACL is critical, as the first matching rule stops further processing. When creating rules, specifying sequence values determines the order of rule processing. If you do not specify a sequence value, the rule is added to the end of the list.

You can specify a mask in either of the following ways:

- Wildcard mask format—for example, 0.0.0.255. The advantage of this format is that it enables you mask any bit, for example by specifying 0.255.0.255.
- Classless Interdomain Routing (CIDR) format—in which you specify the number of bits of the prefix. For example, appending /24 to an IPv4 address is equivalent to specifying 0.0.0.255 as wildcard mask format.

Although in an extended-ACL rule you can specify **mirror**, **log**, and **copy-sflow**, only one of the three is processed, as follows:

- In a permit rule, the order of precedence is **mirror** > **copy-sflow** > **log**.
- In a deny or hard-drop rule, the order of precedence is **log** > **copy-sflow** > **mirror**.

If you are defining rules for a QoS ACL, be aware of the following considerations for ACLs implemented under flow-based QoS. (For details, refer to the *Extreme SLX-OS QoS and Traffic Management Configuration Guide for SLX 9540 and SLX 9850*.)

- Because ACLs applied for QoS use implement a unified counter for all rules in an ACL, rule-level **count** keywords are ignored.
- The **deny** keyword functions as a PASS THROUGH: For a match, QoS action defined for that class is not applied.

For both interface ACLs and receive-path ACLs, you use identical commands to create the ACLs. You also use identical commands to define permit/deny rules in the ACLs. The only variance is the command you use to apply the ACL:

- To apply an interface ACL, from an interface-subtype configuration mode you use the { **ip** | **ipv6** | **mac** } **access-group** command.
- To apply a receive-path ACL, from global configuration mode, you use the { **ip** | **ipv6** } **receive access-group** command.

To delete a rule from an ACL, do the relevant of the following:

- If you know the rule number, enter **no seq seq-value**.
- If you do not know the rule number, type **no** followed by the full syntax without **seq seq-value**.

## Examples

The following example creates an IPv4 extended ACL and defines rules.

```
device(config)# ip access-list extended extdACL5
device(conf-ipacl-ext)# seq 5 deny tcp host 10.24.26.145 any eq 23
device(conf-ipacl-ext)# seq 7 deny tcp any any eq 80
device(conf-ipacl-ext)# seq 10 deny udp any any range 10 25
device(conf-ipacl-ext)# seq 15 permit tcp any any
```

The following example creates an IPv4 extended ACL, defines rules in the ACL, and applies it as a receive-path ACL.

```
device(config)# ip access-list extended ipv4-receive-acl-example
device(conf-ipacl-ext)# hard-drop tcp host 10.0.0.1 any count
device(conf-ipacl-ext)# hard-drop udp any host 20.0.0.1 count
device(conf-ipacl-ext)# permit tcp host 10.0.0.2 any eq telnet count
device(conf-ipacl-ext)# permit tcp host 10.0.0.2 any eq bgp count
device(conf-ipacl-ext)# hard-drop tcp host 10.0.0.3 host 224.0.0.1 count
device(conf-ipacl-ext)# exit
device(config)# ip receive access-group ipv4-receive-acl-example
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# seq (rules in IPv4 standard ACLs)

Inserts filtering rules in IPv4 standard ACLs. Standard ACLs permit or deny traffic according to source address only.

## Syntax

```
seq seq-value { permit | deny | hard-drop } { S_IPAddress mask | host S_IPAddress | any } [ count ] [ log ] [ copy-sflow ]
no seq seq-value
{ permit | deny | hard-drop } { S_IPAddress mask | host S_IPAddress | any } [ count ] [ log ] [ copy-sflow ]
no { permit | deny | hard-drop } { S_IPAddress mask | host S_IPAddress | any } [ count ] [ log ] [ copy-sflow ]
```

## Parameters

### seq

(Optional) Enables you to assign a sequence number to the rule. If you do not specify **seq seq-value**, the rule is added at the end of the list.

*seq-value*

Valid values range from 1 through 65535.

### permit

Specifies rules to permit traffic.

### deny

Specifies rules to deny traffic.

### hard-drop

Overrides the trap behavior for control frames. However, **hard-drop** does not override a **permit** for this address in a preceding rule.

*S\_IPAddress*

Specifies a source address for which you want to filter the subnet.

*mask*

Defines a mask, whose effect is to specify a subnet that includes the source address that you specified. For options to specify the mask, see the Usage Guidelines.

### host

Specifies a source address.

*S\_IPAddress*

The source address.

### any

Specifies all source addresses.

### count

Enables statistics for the rule.

### log

Enables inbound logging for the rule. In addition, the ACL log buffer must be enabled, using the **debug access-list-log buffer** command.

**copy-sflow**

(For incoming traffic) Sends matching packets to the sFlow collector.

## Modes

ACL configuration mode

## Usage Guidelines

This command configures rules to permit or drop traffic based on source addresses. You can also enable counters, logging, and sFlow.

The order of the rules in an ACL is critical, as the first matching rule stops further processing. When creating rules, specifying sequence values determines the order of rule processing. If you do not specify a sequence value, the rule is added to the end of the list.

You can specify a mask in either of the following ways:

- Wildcard mask format—for example, 0.0.0.255. The advantage of this format is that it enables you mask any bit, for example by specifying 0.255.0.255.
- Classless Interdomain Routing (CIDR) format—in which you specify the number of bits of the prefix. For example, appending /24 to an IPv4 address is equivalent to specifying 0.0.0.255 as wildcard mask format.

Although in a standard-ACL rule you can specify both **log** and **copy-sflow**, only one of the two is processed, as follows:

- In a permit rule, only **copy-sflow** is processed.
- In a deny or hard-drop rule, only **log** is processed.

If you are defining rules for a QoS ACL, be aware of the following considerations for ACLs implemented under flow-based QoS. (For details, refer to the *Extreme SLX-OS QoS and Traffic Management Configuration Guide for SLX 9540 and SLX 9850*.)

- Do not include the **count** keyword in ACLs intended for flow-based QoS implementation, because such ACLs automatically share a common counter.
- The **deny** keyword functions as a "pass-through": For a match, QoS action defined for that class is not applied.

To delete a rule from an ACL, do the relevant of the following:

- If you know the rule number, enter **no seq seq-value**.
- If you do not know the rule number, type **no** and then enter the full syntax without **seq seq-value**.

## Examples

The following example shows how to create a IPv4 standard ACL, define rules for it, and apply the ACL to an interface:

```
device# configure
device(config)# ip access-list standard stdACL3
device(conf-ipacl-std)# seq 5 permit host 10.20.33.4
device(conf-ipacl-std)# seq 15 deny any
device(conf-ipacl-std)# exit
device(config)# interface ethernet 2/5
device(conf-if-eth-2/5)# ipv4 access-group stdACL3 in
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# seq (rules in IPv6 extended ACLs)

Inserts filtering rules in IPv6 extended ACLs. IPv6 extended ACLs permit or deny traffic according to source address, as well as other parameters.

## Syntax

```
seq seq-value { permit | deny | hard-drop } ip-protocol { any | S_IPAddress / prefix_len | host S_IPAddress } [ source-operator [ S_port-numbers ] ] { any | D_IPAddress / prefix_len | host D_IPAddress } [ destination-operator [ D_port-numbers ] ] [ dscp DSCPvalue ] [ tcp/udp-flags ] [ vlan vlanID ] [ count ] [ log ] [ mirror ] [ copy-sflow ]
```

```
no seq seq-value
```

```
{ permit | deny | hard-drop } ip-protocol { any | S_IPAddress / prefix_len | host S_IPAddress } [ source-operator [ S_port-numbers ] ] { any | D_IPAddress / prefix_len | host D_IPAddress } [ destination-operator [ D_port-numbers ] ] [ dscp DSCPvalue ] [ tcp/udp-flags ] [ vlan vlanID ] [ count ] [ log ] [ mirror ] [ copy-sflow ]
```

```
no { permit | deny | hard-drop } ip-protocol { any | S_IPAddress / prefix_len | host S_IPAddress } [ source-operator [ S_port-numbers ] ] { any | D_IPAddress / prefix_len | host D_IPAddress } [ destination-operator [ D_port-numbers ] ] [ dscp DSCPvalue ] [ tcp/udp-flags ] [ vlan vlanID ] [ count ] [ log ] [ mirror ] [ copy-sflow ]
```

## Parameters

### seq

(Optional) Enables you to assign a sequence number to the rule. If you do not specify **seq seq-value**, the rule is added at the end of the list.

*seq-value*

Valid values range from 1 through 65535.

### permit

Specifies rules to permit traffic.

### deny

Specifies rules to deny traffic.

### hard-drop

Overrides the trap behavior for control frames. However, **hard-drop** does not override a **permit** for this address in a preceding rule.

### ip-protocol

Indicates the type of IP packet you are filtering. The options are as follows:

<0-255>

Protocol number custom value from 0 through 255.

### ipv6-icmp

Internet Control Message Protocol

### ipv6

Any IP protocol

### tcp

Transmission Control Protocol

**udp**  
User Datagram Protocol

**any**  
Specifies all source addresses.

*S\_IPAddress*  
Specifies a source address for which you want to filter the subnet. For options to abbreviate the address, see the Usage Guidelines.

*prefix\_len*  
Indicates how many of the high-order, contiguous bits of the address comprise the IPv6 prefix.

**host**  
Specifies a source address.

*S\_IPAddress*  
The specific address. For options to abbreviate the address, see the Usage Guidelines.

*source-operator*  
If you specified **tcp** or **udp** *ip-protocol*, the following optional operators are available:

**eq**  
The policy applies to the TCP or UDP port name or number you enter after **eq**.

**gt**  
The policy applies to TCP or UDP port numbers equal to or greater than the port number or the numeric equivalent of the port name you enter after **gt**.

**lt**  
The policy applies to TCP or UDP port numbers that are equal to or less than the port number or the numeric equivalent of the port name you enter after **lt**.

**neq**  
The policy applies to all TCP or UDP port numbers except the port number or port name you enter after **neq**.

**range**  
The policy applies to all TCP or UDP port numbers that are between the first TCP or UDP port name or number and the second one you enter following the **range** keyword. The range includes the port names or numbers you enter. For example, to apply the policy to all ports between and including 23 (Telnet) and 53 (DNS), enter the following: **range 23 53** (two values separated by a space). The first port number in the range must be lower than the last number in the range.

*S\_port-numbers*  
(Valid only when *ip-protocol* is UDP or TCP) Specify one or more port numbers.

**any**  
Specifies all destination addresses.

*D\_IPAddress*  
Specifies a destination address for which you want to filter the subnet. For options to abbreviate the address, see the Usage Guidelines.

*prefix\_len*  
Indicates how many of the high-order, contiguous bits of the address comprise the IPv6 prefix.

**host**  
Specifies a destination address.



*D\_IPaddress*

The destination address. For options to abbreviate the address, see the Usage Guidelines.

*destination-operator*

Specifies one of the following destination operators:

**eq**

The policy applies to the TCP or UDP port name or number you enter after **eq**.

**gt**

The policy applies to TCP or UDP port numbers equal to or greater than the port number or the numeric equivalent of the port name you enter after **gt**.

**lt**

The policy applies to TCP or UDP port numbers that are equal to or less than the port number or the numeric equivalent of the port name you enter after **lt**.

**neq**

The policy applies to all TCP or UDP port numbers except the port number or port name you enter after **neq**.

**range**

The policy applies to all TCP or UDP port numbers that are between the first TCP or UDP port name or number and the second one you enter following the **range** keyword. The range includes the port names or numbers you enter. For example, to apply the policy to all ports between and including 23 (Telnet) and 53 (DNS), enter the following: **range 23 53**. The first port number in the range must be lower than the last number in the range.

*D\_port\_numbers*

(Valid only when *ip-protocol* is UDP or TCP) Specify one or more destination port numbers.

**dscp**

Matches *DSCPvalue* against the DSCP value of the packet.

*DSCPvalue*

From 0 through 63.

**dscp-force**

(In **permit** rules, for routed packets) Forces the outgoing DSCP value of packets that match the filter.

**drop-precedence-force** *dp-value*

(Currently not supported) (In **permit** rules) Sets the force drop precedence by the specified value.

**vlan** *vlanID*

Specifies a VLAN interface to which the ACL is bound.

*tcp/udp-flags*

If you specify **tcp** or **udp** *ip-protocol*, one or more of the following flags are available:

**ack**

Filters packets for which the **ack** (acknowledge) flag is set.

**fin**

Filters packets for which the **fin** (finish) flag is set.

**rst**

Filters packets for which the **rst** (reset) flag is set.

**sync**

Filters packets for which the **syn** (synchronize) flag is set.

**urg**  
Filters packets for which the **urg** (urgent) flag is set.

**push**  
Filters packets for which the **psh** (push) flag is set.

**count**  
Enables statistics for the rule.

**log**  
Enables inbound logging for the rule. In addition, the ACL log buffer must be enabled, using the **debug access-list-log buffer** command.

**mirror**  
(Supported for rules in ACLs applied on physical interfaces to inbound traffic. Not supported for PBR, rACLs, or ACL-RL.) Mirrors packets matching the rule.

**copy-sflow**  
Sends matching inbound packets to the sFlow collector.

## Modes

ACL configuration mode

## Usage Guidelines

IPv6 filtering by destination address is supported only under the following TCAM profiles:

- openflow-optimized-3
- npb

An IPv6 ACL can only be applied to incoming traffic.

The order of the rules in an ACL is critical, as the first matching rule stops further processing. When creating rules, specifying sequence values determines the order of rule processing. If you do not specify a sequence value, the rule is added to the end of the list.

You can abbreviate an IPv6 address by using one or more of the following rules:

- Remove one or more leading zeros from one or more groups of hexadecimal digits; this is usually done to either all or none of the leading zeros. (For example, convert the group 0042 to 42.)
- Omit consecutive sections of zeros, using a double colon (::) to denote the omitted sections. The double colon may only be used once in any given address, as the address would be indeterminate if the double colon were used multiple times. A double colon may not be used to denote an omitted single section of zeros. (For example, 2001:db8::1:2 is valid, but 2001:db8::1:2 or 2001:db8::1:1:1:1 are not permitted.)

Although in an extended-ACL rule you can specify **mirror**, **log**, and **copy-sflow**, only one of the three is processed, as follows:

- In a permit rule, the order of precedence is **mirror** > **copy-sflow** > **log**.
- In a deny or hard-drop rule, the order of precedence is **log** > **copy-sflow** > **mirror**.

To delete a rule from an ACL, do the relevant of the following:

- If you know the rule number, enter **no seq seq-value**.
- If you do not know the rule number, type **no** followed by the full syntax except for **seq seq-value**.

## Examples

The following example creates an IPv6 extended ACL, defines a rule for it, and applies the ACL to an interface.

```
device# configure
device(config)# ipv6 access-list extended ip_acl_1
device(conf-ip6acl-ext)# seq 10 deny ipv6 2001:2002:1234:1::/64 2001:1001:1234:1::/64 count
device(conf-ip6acl-ext)# exit
device(config)# interface ethernet 2/5
device(conf-if-eth-2/5)# ipv6 access-group ip_acl_1 in
```

The following example creates an IPv6 extended ACL, defines rules in the ACL, and applies it as a receive-path ACL (rACL).

```
device(config)# ipv6 access-list extended ipv6-receive-acl-example
device(conf-ipacl-ext)# hard-drop tcp host 10::1 any count
device(conf-ipacl-ext)# hard-drop udp any host 20::1 count
device(conf-ipacl-ext)# permit tcp host 10::2 any eq telnet count
device(conf-ipacl-ext)# permit tcp host 10::2 any eq bgp count
device(conf-ipacl-ext)# hard-drop tcp host 10::3 host ff02::1 count

device(conf-ipacl-ext)# exit
device(config)# ipv6 receive access-group ipv6-receive-acl-example
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# seq (rules in IPv6 standard ACLs)

Inserts filtering rules in IPv6 standard ACLs. Standard ACLs permit or deny traffic according to source address only.

## Syntax

```
seq seq-value { deny | permit | hard-drop } { any | A:B:C:D:E:F:H:I / prefix_len | host S_IPAddress } [ count ] [ log ] [ copy-sflow ]
```

```
no seq seq-value
```

```
{ deny | permit | hard-drop } { any | A:B:C:D:E:F:H:I / prefix_len | host SIP_address | SIP_addressmask } [ count ] [ log ] [ copy-sflow ]
```

```
no { deny | permit | hard-drop } { any | A:B:C:D:E:F:H:I / prefix_len | host SIP_address | SIP_addressmask } [ count ] [ log ] [ copy-sflow ]
```

## Parameters

### seq

(Optional) Enables you to assign a sequence number to the rule. If you do not specify **seq** *seq-value*, the rule is added at the end of the list.

*seq-value*

Valid values range from 1 through 65535.

### permit

Specifies rules to permit traffic.

### deny

Specifies rules to deny traffic.

### hard-drop

Overrides the trap behavior for control frames. However, **hard-drop** does not override a **permit** for this address in a preceding rule.

### any

Specifies all source addresses.

### *S\_IPAddress*

Specify a source address for which you want to filter the subnet. For options to abbreviate the address, see the Usage Guidelines.

*prefix\_len*

Indicates how many of the high-order, contiguous bits of the address comprise the IPv6 prefix.

### host

Specifies a source address.

*SIP\_address*

The source address. For options to abbreviate the address, see the Usage Guidelines.

### count

Enables statistics for the rule.

**log**

Enables inbound logging for the rule. In addition, the ACL log buffer must be enabled, using the **debug access-list-log buffer** command.

**copy-sflow**

Sends inbound matching packets to the sFlow collector.

## Modes

ACL configuration mode

## Usage Guidelines

This command configures rules to permit or drop traffic based on source addresses. You can also enable counters and either logging or sFlow collection.

The order of the rules in an ACL is critical, as the first matching rule stops further processing. When creating rules, specifying sequence values determines the order of rule processing. If you do not specify a sequence value, the rule is added to the end of the list.

An IPv6 ACL can only be applied to incoming traffic.

You can abbreviate an IPv6 address by using one or more of the following rules:

- Remove one or more leading zeros from one or more groups of hexadecimal digits; this is usually done to either all or none of the leading zeros. (For example, convert the group 0042 to 42.)
- Omit consecutive sections of zeros, using a double colon (::) to denote the omitted sections. The double colon may only be used once in any given address, as the address would be indeterminate if the double colon were used multiple times. A double colon may not be used to denote an omitted single section of zeros. (For example, 2001:db8::1:2 is valid, but 2001:db8::1:2 or 2001:db8::1:1:1:1 are not permitted.)

Although in a standard-ACL rule you can specify both **log** and **copy-sflow**, only one of the two is processed, as follows:

- In a permit rule, only **copy-sflow** is processed.
- In a deny or hard-drop rule, only **log** is processed.

To delete a rule from an ACL, do the relevant of the following:

- If you know the rule number, enter **no seq seq-value**.
- If you do not know the rule number, type **no** and then enter the full syntax without *seq-value*.

## Examples

The following example shows how to create an IPv6 standard ACL and define rules for it.

```
device# configure terminal
device(config)# ipv6 access-list standard ipv6-std-acl
device(conf-ip6acl-std)# seq 10 permit host 0:1::1
device(conf-ip6acl-std)# seq 20 deny 0:2::/64
device(conf-ip6acl-std)# seq 30 hard-drop any count
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# seq (rules in MAC extended ACLs)

Inserts filtering rules in Layer 2 (MAC) extended access control lists (ACLs).

## Syntax

```
[ seq seq-value ] permit { any | SMAC-address mask | host SMAC-address } { any | host DMAC-address | DMAC-address mask } [ vlan { any | vlanID } ] [ custom-EtherType | arp [ arp-guard ] | cfm | ipv4 | ipv6 | mpls ] [ pcp pcp-match-value ] [ pcp-force out-pcp-value ] [ count ] [ log ] [ mirror ] [ copy-sflow ]

[ seq seq-value ] permit { any | SMAC-address mask | host SMAC-address } { any | host DMAC-address | DMAC-address mask } [ vlan-tag-format { untagged vlan vlan-id | single-tagged vlan { any | vlan-id [ vlan-id-mask ] } | double-tagged outer-vlan { any | vlan-id [ vlan-id-mask ] } inner-vlan { any | vlan-id [ vlan-id-mask ] } } ] [ custom-EtherType | arp [ arp-guard ] | cfm | ipv4 | ipv6 | mpls ] [ pcp pcp-match-value ] [ pcp-force out-pcp-value ] [ count ] [ log ] [ mirror ] [ copy-sflow ]

[ seq seq-value ] { deny | hard-drop } { any | SMAC-address mask | host SMAC-address } { any | host DMAC-address | DMAC-address mask } [ vlan { any | vlanID } ] [ custom-EtherType | arp [ arp-guard ] | cfm | ipv4 | ipv6 | mpls ] [ pcp pcp-match-value ] [ count ] [ log ] [ mirror ] [ copy-sflow ]

[ seq seq-value ] { deny | hard-drop } { any | SMAC-address mask | host SMAC-address } { any | host DMAC-address | DMAC-address mask } [ vlan-tag-format { untagged vlan vlan-id | single-tagged vlan { any | vlan-id [ vlan-id-mask ] } | double-tagged outer-vlan { any | vlan-id [ vlan-id-mask ] } inner-vlan { any | vlan-id [ vlan-id-mask ] } } ] [ custom-EtherType | arp [ arp-guard ] | cfm | ipv4 | ipv6 | mpls ] [ pcp pcp-match-value ] [ count ] [ log ] [ mirror ] [ copy-sflow ]

no seq seq-value

no permit { any | SMAC-address mask | host SMAC-address } { any | host DMAC-address | DMAC-address mask } [ vlan { any | vlanID } ] [ custom-EtherType | arp [ arp-guard ] | cfm | ipv4 | ipv6 | mpls ] [ pcp pcp-match-value ] [ pcp-force out-pcp-value ] [ count ] [ log ] [ mirror ] [ copy-sflow ]

no permit { any | SMAC-address mask | host SMAC-address } { any | host DMAC-address | DMAC-address mask } [ vlan-tag-format { untagged vlan vlan-id | single-tagged vlan { any | vlan-id [ vlan-id-mask ] } | double-tagged outer-vlan { any | vlan-id [ vlan-id-mask ] } inner-vlan { any | vlan-id [ vlan-id-mask ] } } ] [ custom-EtherType | arp [ arp-guard ] | cfm | ipv4 | ipv6 | mpls ] [ pcp pcp-match-value ] [ pcp-force out-pcp-value ] [ count ] [ log ] [ mirror ] [ copy-sflow ]

no { deny | hard-drop } { any | SMAC-address mask | host SMAC-address } { any | host DMAC-address | DMAC-address mask } [ vlan { any | vlanID } ] [ custom-EtherType | arp [ arp-guard ] | cfm | ipv4 | ipv6 | mpls ] [ pcp pcp-match-value ] [ count ] [ log ] [ mirror ] [ copy-sflow ]

no { deny | hard-drop } { any | SMAC-address mask | host SMAC-address } { any | host DMAC-address | DMAC-address mask } [ vlan-tag-format { untagged vlan vlan-id | single-tagged vlan { any | vlan-id [ vlan-id-mask ] } | double-tagged outer-vlan { any | vlan-id [ vlan-id-mask ] } inner-vlan { any | vlan-id [ vlan-id-mask ] } } ] [ custom-EtherType | arp [ arp-guard ] | cfm | ipv4 | ipv6 | mpls ] [ pcp pcp-match-value ] [ count ] [ log ] [ mirror ] [ copy-sflow ]
```

## Parameters

### seq

(Optional) Enables you to assign a sequence number to the rule. If you do not specify **seq seq-value**, the rule is added at the end of the list.

### seq-value

Valid values range from 1 through 65535.

**permit**

Specifies rules to permit traffic.

**deny**

Specifies rules to deny traffic.

**hard-drop**

Specifies rules to deny traffic.

**any**

Specifies any source MAC addresses.

*SMAC-address*

Specifies a source MAC address and a comparison mask.

*mask*

Specifies the mask using Fs and zeros. For example, to match on the first two bytes of the address aabb.ccdd.eeff, use the mask ffff.0000.0000. In this case, the clause matches all MAC addresses that contain "aabb" as the first two bytes and any values in the remaining bytes.

**host** *SMAC-address*

Specifies a source MAC address. Use the format HHHH.HHHH.HHHH.

**any**

Specifies any destination MAC addresses.

*DMAC-address*

Specifies a destination MAC address and a comparison mask.

*mask*

Specifies the mask using Fs and zeros. For example, to match on the first two bytes of the address aabb.ccdd.eeff, use the mask ffff.0000.0000. In this case, the clause matches all MAC addresses that contain "aabb" as the first two bytes and any values in the remaining bytes.

**host** *DMAC-address*

Specifies a destination MAC address. Use the format HHHH.HHHH.HHHH.

**vlan**

Specifies VLANs to which the ACL is bound.

**any**

Specifies any VLAN.

*vlanID*

Specifies a VLAN.

**vlan-tag-format**

Specifies **untagged**, **single-tagged**, or **double-tagged** VLAN traffic.

**untagged**

Specifies traffic with no VLAN tag.

**vlan**

Specifies a VLAN or any VLAN.

**any**

Specifies any VLAN.



*vlanID*

Specifies a VLAN or range of VLANs.

### **single-tagged**

Specifies traffic with a single VLAN, a range of VLANs, or any VLAN.

#### **vlan**

Specifies a VLAN or any VLAN.

#### **any**

Specifies any VLAN.

*vlanID* [ *vlan-id-mask* ]

Specifies a VLAN or range of VLANs. Optionally, you can use a 12-bit hex value to specify a range of VLANs. For example, 0x0FFF specifies all VLANs for which the last 8 bits are 0.

### **double-tagged**

Specifies traffic with both an outer and an inner VLAN, a range of such VLANs, or any such VLAN.

#### **outer-vlan**

Specifies an outer VLAN, a range of outer VLANs, or any outer VLAN.

#### **any**

Specifies any outer VLAN.

*vlanID* [ *vlan-id-mask* ]

Specifies a outer VLAN or range of VLANs. Optionally, you can use a 12-bit hex value to specify a range of VLANs. For example, 0x0FFF specifies all VLANs for which the last 8 bits are 0.

#### **inner-vlan-id**

Specifies inner VLANs.

#### **any**

Specifies any inner VLAN.

*vlanID* [ *vlan-id-mask* ]

Specifies an inner VLAN or range of VLANs. Optionally, you can use a 12-bit hex value to specify a range of VLANs. For example, 0x0FFF specifies all VLANs for which the last 8 bits are 0.

#### *custom-EtherType*

Specifies a custom EtherType value for which to set the permit or deny conditions. Valid values range from 1536 through 65535.

#### **arp**

Specifies to permit or deny the ARP protocol (0x0806).

#### **arp-guard**

Enables ARP Guard.

#### **cfm**

Specifies to permit or deny the CFM protocol (0x8902).

#### **ipv4**

Specifies to permit or deny the IPv4 protocol (0x0800).

#### **ipv6**

Specifies to permit or deny the IPv6 protocol (0x86dd).

**mpls**

Specifies to permit or deny the MPLS protocol (0x8847).

**pcp** *pcp-match-value*

Filters by PCP priority value. Permitted values are 0 through 7.

**pcp-force** *out-pcp-value*

(In permit rules applied to incoming traffic) Modifies the PCP priority value to the specified value. Permitted values are 0 through 7.

**drop-precedence-force** *dp-value*

(Currently not supported) (In permit rules applied to incoming traffic) Sets the force drop precedence by the specified value. Permitted values are 0 through 2.

**count**

Enables statistics for the rule.

**log**

Enables inbound logging for the rule. In addition, the ACL log buffer must be enabled, using the **debug access-list-log buffer** command.

**mirror**

(Supported for rules in ACLs applied on physical interfaces to inbound traffic) Mirrors packets matching the rule.

**copy-sflow**

(Supported for incoming traffic) Sends matching packets to the sFlow collector.

## Modes

ACL configuration mode

## Usage Guidelines

This command configures rules to permit or drop traffic based on source and destination MAC addresses and protocol type. You can also enable counters, logging, mirroring, and sending packets to the sFlow collector per rule.

The order of the rules in an ACL is critical, as the first matching rule stops further processing. When creating rules, specifying sequence values determines the order of rule processing. If you do not specify a sequence value, the rule is added to the end of the list.

The **hard-drop** keyword is equivalent to the **deny** keyword.

Although in an extended-ACL rule you can specify **mirror**, **log**, and **copy-sflow**, only one of the three is processed, as follows:

- In a permit rule, the order of precedence is **mirror** > **copy-sflow** > **log**.
- In a deny or hard-drop rule, the order of precedence is **log** > **copy-sflow** > **mirror**.

The following guidelines apply to rules that contain one of the **vlan-tag-format** options:

- Fully supported only on the layer2-optimized-1 TCAM profile.
- Supported only when an ACL containing such rules is applied to physical or port-channel interfaces for ingress traffic. Ignored for ACLs applied to egress traffic and for ACLs applied to VLANs.
- The **double-tagged** option is supported only for VPLS VLANs. The **untagged** and the **single-tagged** options are supported for all VLANs.

- An implicit LACP BPDUs **permit** rule precedes the implicit **deny** rule. But to avoid port-channel interface flap for VPLS endpoints over dynamic LAGs, make sure that the LACP BPDUs do not match any of the configured **deny** rules.

Support for the **pcp** and **pcp-force** keywords varies with TCAM profile, as shown in the following table:

**TABLE 5** Support for PCP keywords under TCAM profiles

Keyword	Default	openflow-optimised-1	openflow-optimised-2
<b>pcp</b>	Not supported	Supported	Supported
<b>pcp-force</b>	Not supported	Supported	Not supported

To enable ARP Guard on an interface, you create and apply a MAC extended ACL with rules that contain the **arp** and **arp-guard** keywords. See an example below.

To delete a rule from an ACL, do the relevant of the following:

- If you know the rule number, enter **no seq seq-value**.
- If you do not know the rule number, type **no** and then enter the full syntax without *seq-value*.

## Examples

The following example creates a rule in a MAC extended ACL to deny IPv4 traffic from the source MAC address 0022.3333.4444 to the destination MAC address 0022.3333.5555 and enable packet counting.

```
device# configure terminal
device(config)# mac access-list extended ACL1
device(conf-macl-ext)# seq 100 deny 0022.3333.4444 0022.3333.5555 ipv4 count
```

The following example creates rule in a MAC extended ACL to filter permit traffic by VLAN tag types and enable packet counting.

```
device# configure terminal
device(config)# mac access-list extended ACL1
device(conf-macl-ext)# permit host 0001.0001.0001 any vlan-tag-format untagged vlan 100 count
device(conf-macl-ext)# permit host 0002.0002.0002 any vlan-tag-format single-tagged vlan 200 count
device(conf-macl-ext)# permit host 0003.0003.0003 any vlan-tag-format double-tagged outer-vlan 300
inner-vlan-id 400 count
device(conf-macl-ext)# permit host 0001.0001.0004 any vlan-tag-format untagged vlan 100 0x0fff count
device(conf-macl-ext)# permit host 0003.0003.0005 any vlan-tag-format double-tagged outer-vlan 300
0xfff inner-vlan-id 400 0x0fff count
device(conf-macl-ext)# permit host 0003.0003.0006 any vlan-tag-format double-tagged outer-vlan any
inner-vlan-id any count
```

The following example creates an MAC extended ACL with rules that enable ARP Guard and then applies it to the relevant interface.

```
device# configure terminal
device(config)# mac access-list extended arp_guard_enable_1
device(conf-macl-ext)# permit host 0014.2211.1111 any vlan 100 arp arp-guard
device(conf-macl-ext)# permit host 0014.2211.1112 any vlan 101 arp arp-guard
device(conf-macl-ext)# deny any any arp
device(conf-macl-ext)# permit any any
device(conf-macl-ext)# exit

device(conf)# interface ethernet 1/2
device(conf-if-eth-1/2)# switchport
device(conf-if-eth-1/2)# mac access-group arp_guard_enable_1 in
```

The following example deletes a rule from a MAC extended ACL.

```
device# configure terminal
device(config)# mac access-list extended ACL1
device(conf-macl-ext)# no seq 100
```

## History

Release version	Command history
16r.1.00	This command was introduced.
17r.1.00	This command was modified to support ARP Guard and filtering by VLAN tag type.

# seq (rules in MAC standard ACLs)

Inserts filtering rules in Layer 2 (MAC) standard ACLs. Standard ACLs permit or deny traffic according to source address only.

## Syntax

```
seq seq-value { deny | permit | hard-drop } { any | SMAC_address mask | host SMAC_address } [count ] [ log ] [ copy-sflow ]
no seq seq-value
{ deny | permit | hard-drop } { any | SMAC_address mask | host SMAC_address } [count ] [ log ] [ copy-sflow ]
no seq { deny | permit | hard-drop } { any | SMAC_address mask | host SMAC_address } [count ] [ log ] [ copy-sflow ]
```

## Parameters

### seq

(Optional) Enables you to assign a sequence number to the rule. If you do not specify **seq seq-value**, the rule is added at the end of the list.

*seq-value*

Valid values range from 1 through 65535.

### permit

Specifies rules to permit traffic.

### deny

Specifies rules to deny traffic.

### hard-drop

Specifies rules to deny traffic.

### any

Specifies all source MAC addresses.

### SMAC\_address

Specifies a source MAC address and a comparison mask.

*mask*

Specify the mask using F's and zeros. For example, to match on the first two bytes of the address aabb.ccdd.eeff, use the mask fff.0000.0000. In this case, the clause matches all MAC addresses that contain "aabb" as the first two bytes and any values in the remaining bytes.

### host

Specifies a source MAC address.

*SMAC\_address*

Use the format HHHH.HHHH.HHHH.

### count

Enables statistics for the rule.

### log

Enables inbound logging for the rule. In addition, the ACL log buffer must be enabled, using the **debug access-list-log buffer** command.

**copy-sflow**

Sends matching inbound packets to the sFlow collector.

## Modes

ACL configuration mode

## Usage Guidelines

This command configures rules to permit or drop traffic based on source MAC address. You can also enable counters, logging, and sFlow.

The order of the rules in an ACL is critical, as the first matching rule stops further processing. When creating rules, specifying sequence values determines the order of rule processing. If you do not specify a sequence value, the rule is added to the end of the list.

The **hard-drop** keyword is equivalent to the **deny** keyword.

Although in a standard-ACL rule you can specify both **log** and **copy-sflow**, only one of the two is processed, as follows:

- In a permit rule, only **copy-sflow** is processed.
- In a deny or hard-drop rule, only **log** is processed.

To delete a rule from an ACL, do the relevant of the following:

- If you know the rule number, enter **no seq seq-value**.
- If you do not know the rule number, type **no** and then enter the full syntax, without **seq seq-value**.

## Examples

The following command creates statistic-enabled rules in a MAC standard ACL.

```
device# configure terminal
device(config)# mac access-list standard ACL1
device(conf-macl-std)# seq 100 deny host 0022.3333.4444 count
device(conf-macl-std)# seq 110 permit host 0011.3333.5555 count
```

The following command deletes a rule in a MAC standard ACL, by specifying the **seq** number.

```
device# configure terminal
device(config)# mac access-list standard ACL1
device(conf-macl-std)# no seq 100
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# service password-encryption

Enables a global password encryption policy that overrides **username** encryption settings.

## Syntax

**service password-encryption**

**no service password-encryption**

## Command Default

Global password encryption policy is enabled.

## Modes

Global configuration mode

## Usage Guidelines

If global password encryption policy is enabled, it overrides **username** encryption settings.

To disable global password encryption policy, enter the **no** form of this command.

Even if global password encryption policy is disabled, the following **username** syntax does encrypt that user's password: **encryption-level 7**.

## Examples

The following example enables global password encryption policy.

```
device# configure terminal
device(config)# service password-encryption
```

The following example disables global password encryption policy.

```
device# configure terminal
device(config)# no service password-encryption
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# service-policy

Binds a policy map to an interface.

## Syntax

```
service-policy in | out policy-mapname  
no service-policy in | out
```

## Command Default

No service policy is created.

## Parameters

**in**  
Binds policy map to inbound traffic.

**out**  
Binds policy map to outbound traffic.

*policy-mapname*  
Name of the policy map.

## Modes

Interface configuration mode

## Usage Guidelines

This command applies a policy-map containing a class-map with specific Policer parameters and match critters to a switch interface. The policy map must be configured before you can apply it (refer to the description of the **policy-map** command).

The **no** form of this command removes the service policy.



## Examples

To create a service policy for outbound traffic on a specific Ethernet interface:

```
device# configure terminal
device(config)# interface ethernet 2/8
device(conf-if-eth-2/8)# service-policy out policymap1
```

To remove a service policy for outbound traffic from a specific Ethernet interface:

```
device# configure terminal
device(config)# interface ethernet 2/8
device(conf-if-eth-2/8)# no service-policy out
```

To remove a service-policy for inbound traffic on a specific Ethernet interface:

```
device# configure terminal
device(config)# interface ethernet 2/8
device(conf-if-eth-2/8)# no service-policy in
```

## History

Release version	Command history
16r.1.00	This command was introduced.

## session

Configures an LDP session for the neighbor-based filtering of inbound or outbound FECs. You can also configure an authentication key for the LDP session.

### Syntax

```
session remote-ip-addr { filter-fec-in | filter-fec-out prefix-list } | { key string }
```

```
no session remote-ip-addr { filter-fec-in | filter-fec-out } | { key }
```

### Command Default

None

### Parameters

*remote-ip-addr*

Specifies the IP address of the LDP peer.

**filter-fec-in**

Applies neighbor-based LDP FEC filtering on inbound FECs.

**filter-fec-out**

Applies neighbor-based LDP FEC filtering on outbound FECs.

*prefix-list*

Specifies the prefix list for the neighbor to which the filter is applied to allow or prevent the advertisement of FECs.

**key string**

Configures an authentication key on the LDP session. The LDP session can be to an adjacent peer (basic discovery) or to the targeted peer (extended discovery). The string variable specifies a text string of up to 80 characters used for authentication between LDP peers. It must be configured on both peers.

### Modes

MPLS LDP configuration mode

### Usage Guidelines

Use the **no** form of the command to remove the neighbor-based FEC filtering or authentication key from the LDP session.

## Examples

The following example configures LDP to prevent the advertisement of FEC 10.40.40.0/24 through the list-out prefix list and allow all others FECs to neighbor 10.12.12.12.

```
device# configure terminal
device(config)# ip prefix-list list-out deny 10.40.40.0/24
device(config)# ip prefix-list list-out permit 0.0.0.0/0 ge 32
device(config)# router mpls
device(config-router-mpls)# ldp
device(config-router-mpls-ldp)# session 10.12.12.12 filter-fec-out list-out
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# set-debug

Enables debug configurations for Intermediate System-to-Intermediate System (IS-IS).

## Syntax

**set-debug nsr**

**no set-debug nsr**

## Command Default

Disabled.

## Parameters

**nsr** Specifies nonstop routing (NSR) debugs.

## Modes

IS-IS router configuration mode

## Examples

The following example enables NSR debug configurations for IS-IS.

```
device# configure terminal
device(config)# router isis
device(config-isis-router)# set-debug nsr
```

The following example disables NSR debug configurations for IS-IS.

```
device# configure terminal
device(config)# router isis
device(config-isis-router)# no set-debug nsr
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# set extcommunity

Sets an extended BGP community attribute in a route-map instance.

## Syntax

```
set extcommunity { rt extcommunity value | soo extcommunity value }
no set extcommunity
```

## Command Default

No extended BGP community attribute is set.

## Parameters

**rt**

Specifies the route target (RT) extended community attribute.

**soo**

Specifies the site of origin (SOO) extended community attribute.

*extcommunity value*

Specifies the value. The value can be one of the following:

ASN:nn—autonomous-system-number:network-number

Autonomous system (AS) number and network number.

IPAddress:nn—ip-address:network-number

IP address and network number.

## Modes

Route-map configuration mode.

## Usage Guidelines

Enter **no set extcommunity** to delete an extended community set statement from the configuration file.

## Examples

The following example sets the route target to extended community attribute 1:1 for routes that are permitted by the route map.

```
device# configure terminal
device(config)# route-map extComRmap permit 10
device(config-route-map-sendExtComRmap/permit/10)# set extcommunity rt 1:1
```

set extcommunity

The following example sets the site of origin to extended community attribute 2:2 for routes that are permitted by the route map.

```
device# configure terminal
device(config)# ip community-list extended 1 permit 123:2
device(config)# route-map extComRmap permit 10
device(config-route-map-sendExtComRmap/permit/10)# set extcommunity soo 2:2
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# set ip interface null0

Drops traffic when the null 0 statement becomes the active setting as determined by the route-hop selection process for IPv4 policy-based routing.

## Syntax

```
set ip interface null0
no set ip interface null0
```

## Modes

Route-map configuration mode

## Usage Guidelines

The **no** form of this command deletes the matching filter from the ACL.

## Examples

The following example configures the next hop as NULL0 interface to send the traffic to the null interface, thus dropping the packet instead of forwarding it.:

```
device(config)# route-map test-route permit 99
device(config-route-map-test-route/permit/99)# set ip interface null0
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# set ip next-hop

Sets the IPv4 address of the next hop in a route-map instance.

## Syntax

```
set ip [ global | vrf vrf-name ] next-hop A.B.C.D
```

```
no set ip next-hop A.B.C.D
```

## Parameters

*A.B.C.D*

IPv4 address of the next hop.

**global**

Specifies that the next specified hop address is to be resolved from the global routing table.

**vrf** *vrf-name*

Specifies from which VRF routing table the specified next hop address will be resolved.

**next hop** *A.B.C.D*

Sets the next hop to which to route the packet. The next hop must be adjacent.

## Modes

Route-map configuration mode

## Usage Guidelines

Use the **no** form of this command to delete the matching filter from the ACL.

When a route-map is applied to BGP, and the route-map has multiple **set ip next-hop** statements in a single instance, BGP considers the last **set ip next-hop** in the route-map.

## Examples

The following example configures IPv4 address as the next hop to which the traffic that matches a match statement in the route map must be routed.

```
device(config)# route-map test-route permit 99
device(config-route-map-test-route/permit/99)# set ip next-hop 192.168.3.1
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# set ipv6 interface null0

Drops traffic when the null 0 statement becomes the active setting as determined by the route-hop selection process for IPv6 policy-based routing.

## Syntax

```
set ipv6 interface null0
no set ipv6 interface null0
```

## Modes

Route-map configuration mode

## Usage Guidelines

The **no** form of this command deletes the matching filter from the ACL.

## Examples

The following example configures the next hop as NULL0 interface to send the traffic to the null interface, thus dropping the packet instead of forwarding it.:

```
device(config)# route-map test-route permit 99
device(config-route-map-test-route/permit/99)# set ipv6 interface null0
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# set ipv6 next-hop

Sets the IPv6 address of the next hop in a route-map instance.

## Syntax

**set ipv6** [ *global* | *vrf vrf-name* ] **next-hop** AAAA:BBBB:CCCC:DDDD:EEEE:FFFF:GGGG:HHHH

**no set ipv6 next-hop** AAAA:BBBB:CCCC:DDDD:EEEE:FFFF:GGGG:HHHH

## Parameters

AAAA:BBBB:CCCC:DDDD:EEEE:FFFF:GGGG:HHHH

IPv6 address of the next hop.

**global**

Specifies that the next specified hop address is to be resolved from the global routing table.

**vrf** *vrf-name*

Specifies from which VRF routing table the specified next hop address will be resolved.

**next hop** AAAA:BBBB:CCCC:DDDD:EEEE:FFFF:GGGG:HHHH

Sets the next hop to which to route the packet. The next hop must be adjacent.

## Modes

Route-map configuration mode

## Usage Guidelines

Use the **no** form of this command to delete the matching filter from the ACL.

## Examples

The following example configures IPv6 address as the next hop to which the traffic that matches a match statement in the route map must be routed.

```
device(config)# route-map test-route permit 99
device(config-route-map-test-route/permit/99)# set ip next-hop 2001:db8:0:0:0:ff00:42:8329
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# set-overload-bit

Configures a device to signal other devices not to use it as an intermediate hop in their shortest path first (SPF) calculations if the resources of the intermediate system are overloaded and preventing the IS from properly performing Intermediate System-to-Intermediate System (IS-IS) routing.

## Syntax

**set-overload-bit**

**set-overload-bit on-startup** *value*

**set-overload-bit on-startup wait-for-bgp** [ *max-bgp-wait-time* ]

**no set-overload-bit**

**no set-overload-bit on-startup** *interval*

**no set-overload-bit on-startup wait-for-bgp** [ *max-bgp-wait-time* ]

## Command Default

A device automatically sets the overload on in its Link State PDUs (LSPs) to other intermediate systems if an overload condition occurs.

## Parameters

### on-startup

Sets the overload bit when the system starts up. The overload bit remains set for the number of seconds configured or until Border Gateway Protocol (BGP) has converged, depending on the subsequent argument or keyword specified.

### *interval*

Specifies the number of seconds the overload bit remains set when the system starts up. Valid values range from 5 through 86400 seconds (24 hours).

### wait-for-bgp

Specifies that the overload bit is set when the system starts up and remains set until BGP has converged.

### *max-bgp-wait-time*

Specifies the maximum time in seconds that IS-IS waits for BGP convergence to complete. When the configured time interval is exceeded without BGP convergence, IS-IS exits the overload state. Valid values range from 5 seconds through 86400 seconds (24 hours). The default is 600 seconds (10 minutes).

## Modes

IS-IS router configuration mode

## Usage Guidelines

The **no** form of the command removes the configured overload state.

## Examples

The following example sets the overload bit to on with immediate effect.

```
device# configure terminal
device(config)# router isis
device(config-isis-router)# set-overload-bit
```

The following example configures the device to set the overload bit on in all its IS-IS LSPs sent to other ISs during the first five seconds following a successful software reload. After the five seconds expire, the device resets the overload bit to off in all its IS-IS LSPs.

```
device# configure terminal
device(config)# router isis
device(config-isis-router)# set-overload-bit on-startup 60
```

The following example specifies that the overload bit is set upon system startup and remains set until BGP has converged and specifies that the device that 86400 seconds is the maximum time that IS-IS will wait for BGP convergence to complete.

```
device# configure terminal
device(config)# router isis
device(config-isis-router)# set-overload-bit on-startup wait-for-bgp 86400
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# sflow enable (global version)

Enables sFlow globally.

## Syntax

**sflow enable**

**no sflow enable**

## Command Default

sFlow is disabled on the system.

## Modes

Global configuration mode

## Usage Guidelines

The **no** form of this command disable sFlow globally.

## Examples

To enable sFlow globally:

```
device# configure terminal
device(config)# sflow enable
```

## History

Release version	Command history
17r.1.01	This command was introduced..

# sflow collector

Configures the forwarding of sFlow datagrams to collectors.

## Syntax

**sflow collector** { *IPv4address* | *IPv6address* } [ **use-vrf** *vrf-name* ]

**no sflow collector** { *IPv4address* | *IPv6address* } [ **use-vrf** *vrf-name* ]

## Parameters

*IPv4address*

Specifies an IPv4 address in dotted-decimal format for the collector.

*IPv6address*

Specifies an IPv6 address for the collector.

**use-vrf** *vrf-name*

Specifies a VRF through which to connect to the collector. See the Usage Guidelines.

## Modes

Global configuration mode

## Usage Guidelines

You can only specify up to five sFlow collectors; this includes all VRFs.

Use the **no** form of this command to reset the specified collector address to a null value.

By default, all management services are enabled on the management VRF ("mgmt-vrf") and the default VRF ("default-vrf").

## Examples

To specify the sFlow collectors for an IPv4 address with the default port on the management VRF:

```
device# configure terminal
device(config)# sflow collector 192.10.138.176
```

To specify the sFlow collectors for an IPv4 address with a nondefault port on a user-specified VRF:

```
device# configure terminal
device(config)# sflow collector 192.10.138.176 50 use-vrf myvrf
```

To specify the sFlow collectors for an IPv6 address with a nondefault port on the management VRF:

```
device# configure terminal
device(config)# sflow collector 3ff3:1900:4545:3:200:f8ff:fe21:67cf:6343 50
```

## History

Release version	Command history
17r.1.01	This command was introduced..

# sflow polling-interval (global version)

Configures the polling interval globally.

## Syntax

**sflow polling-interval** *interval\_value*

**no sflow polling-interval**

## Parameters

*interval\_value*

Specifies a value in seconds to set the polling interval. Valid values range from 1 through 65535 seconds.

## Command Default

The default is 20.

## Modes

Global configuration mode

## Usage Guidelines

The interval is the maximum number of seconds between successive samples of counters to be sent to the collector.

The **no** form of this command restores the default value.

## Examples

To set the polling interval to 135 seconds:

```
device# configure terminal
device(config)# sflow polling-interval 135
```



# sflow sample-rate (global version)

Sets the number of packets that are skipped before the next sample is taken.

## Syntax

**sflow sample-rate** *samplerate*

**no sflow sample-rate**

## Command Default

The default is 32768.

## Parameters

*samplerate*

Specifies the sampling rate value in packets. Valid values range from 2 through 16777215 packets.

## Modes

Global configuration mode

## Usage Guidelines

Sample-rate is the average number of packets skipped before the sample is taken.

The **no** form of this command restores the default sampling rate.

## Examples

To change the sampling rate to 4096:

```
device# configure terminal
device(config)# sflow sample-rate 4096
```

# sflow source-interface

Specifies the IPv4 or IPv6 address of either the Ethernet, Virtual Ethernet (ve), or loopback interface as the source of sFlow packets.

## Syntax

```
sflow source-interface { ethernet slot/port | loopback loopback_num | ve ve_interface }
no sflow source-interface
```

## Command Default

sFlow uses the ethernet port by default.

## Parameters

**ethernet** *slot/port*

Specifies an Ethernet slot and port. The valid slot value is 0.

**loopback** *loopback\_num*

Specifies a loopback interface. Valid values range from 1 through 255.

**ve** *ve-interface-number*

Specifies a virtual Ethernet (VE) interface. Valid values range from 1 through 255.

## Modes

Global configuration mode

## Usage Guidelines

The "no" form of the command is available once the source type has been specified.

## Examples

To specify the Ethernet address as the source of sFlow packets:

```
device# config
device(config)# sflow source-interface ethernet 0/1
```

To specify the loopback interface as the source of sFlow packets:

```
device(config)# sflow source-interface loopback 42
```

To confirm the above configuration:

```
device(config)# do show running-config sflow
sflow enable
sflow source-interface loopback 42
```

To disable the above configuration and revert to the default:

```
device(config)# no sflow source-interface
device(config)# do show running-config sflow
sflow enable
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# shutdown (STP)

Disables Spanning Tree Protocol (STP), Rapid Spanning Tree Protocol (RSTP), Multiple Spanning Tree Protocol (MSTP), Per-VLAN Spanning Tree+ (PVST+), or Rapid PVST+ (R-PVST+) globally.

## Syntax

**shutdown**

**no shutdown**

## Command Default

STP is not enabled as it is not required in a loop-free topology.

## Modes

Any of the supported spanning tree configuration modes (STP, RSTP, MSTP, PVST+, R-PVST+)

## Usage Guidelines

Enter **no shutdown** to re-enable any of the supported versions of STP.

## Examples

To disable RSTP globally:

```
device# configure terminal
device(config)# protocol spanning-tree rstp
device(conf-rstp)# shutdown
```

To enable MSTP globally:

```
device# configure terminal
device(config)# protocol spanning-tree mstp
device(conf-mstp)# no shutdown
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# shutdown (link-oam)

Allows you to enable or disable the link-oam protocol.

## Syntax

`shutdown`

`no shutdown`

## Command Default

This command is executed on the local switch.

## Modes

Link OAM configuration mode

## Usage Guidelines

By default, link oam protocol is enabled when protocol link-oam is configured. Using this command, the protocol can be disabled or enabled.

## Examples

```
device (config-link-oam) #shutdown
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# shutdown-time

Configures the interval after which an interface that is shut down by loop detection (LD) protocol is automatically reenabled.

## Syntax

```
shutdown-time minutes
no shutdown-time
```

## Command Default

See the Usage Guidelines.

## Parameters

*minutes*

The interval in minutes. Range is from 0 through 1440. The default is 0. (The interface is not automatically reenabled.)

## Modes

Protocol Loop Detect configuration mode.

## Usage Guidelines

Use the **no** form of this command to revert to the default interval and prevent the interface from being automatically reenabled.

## Examples

### Examples

To specify a shutdown time of 20 minutes:

```
device# configure terminal
device(config)# loop-detection
device(config-loop-detect)# shutdown-time 20
```

To revert to the default interval and prevent the interface from being automatically reenabled:

```
device# configure terminal
device(config)# loop-detection
device(config-loop-detect)# no shutdown-time
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# Show A through Show I

---

## show access-list

Displays ACL status information for a given network, protocol, and inbound/outbound direction.

### Syntax

```
show access-list { ip | ipv6 | mac }  
show access-list { ip | ipv6 | mac } name { in | out }  
show access-list interface { ethernet slot / port | port-channel index | ve vlan_id | vlan vlan_id } { in | out }  
show access-list interface management slot / port in  
show access-list mac name interface { ethernet slot / port | port-channel index | vlan vlan_id } { in | out }  
show access-list { ip | ipv6 } name interface { ethernet slot / port | port-channel index | ve vlan_id } { in | out }  
show access-list { ip | ipv6 } name interface management slot / port in  
show access-list receive { ip | ipv6 }
```

### Parameters

<b>ip</b>	Specifies the IPv4 Layer 3 network protocol.
<b>ipv6</b>	Specifies the IPv6 Layer 3 network protocol.
<b>mac</b>	Specifies the medium access control (MAC) Layer 2 network protocol.
<b>in</b>	Specifies incoming binding direction.
<b>out</b>	Specifies outgoing binding direction.
<i>name</i>	Specifies the ACL name.
<b>interface</b>	Filters by interface.
<b>ethernet</b>	Specifies a physical Ethernet interface.
<i>slot</i>	Specifies a valid slot number.
<i>port</i>	Specifies a valid port number.

**port-channel** *index*

Specifies a port-channel interface.

**ve** *vlan\_id*

Specifies a virtual Ethernet (VE) interface.

**vlan** *vlan\_id*

Specifies a VLAN interface.

**management** *slot / port*

Specifies a management interface.

**receive**

Specifies an ACL that applies to device receive-path traffic.

## Modes

Privileged EXEC mode

## Usage Guidelines

You can show information for a specified ACL or only for that ACL on a specified interface. You can also display information for all ACLs bound to a specified physical interface, port-channel, VLAN or VE.

The command also displays information for receive-path ACLs.

## Command Output

The **show access-list** command displays the following information:

Output field	Description
Active	The rule is active and implements the configured action.
Partial	The rule is partially programmed, with the configured action implemented in some cases. This is typically seen for logical interfaces like VLAN, which span multiple hardware resources.
In progress	The rule is currently being programmed into the hardware.
Inactive	The rule is inactive and is not programmed in the hardware. This is typically seen when the hardware resources limit is reached.

## Examples

The following example displays the names of IPv4 ACLs applied to the device, interfaces to which they are applied, and the incoming/outgoing direction.

```
device# show access-list ip
Interface Ve 171
  Inbound access-list is not set
  Outbound access-list is IPV4_ACL_000 (From User)
Interface Ethernet 1/2
  Inbound switched access-list is IP_ACL_STD_EXAMPLE (From User)
  Outbound access-list is IP_ACL_EXT_EXAMPLE (From User)
```



The following example displays all interfaces on which an IPv4 ACL is applied in the outgoing direction.

```
device# show access-list ip IPV4_ACL_000 out
ip access-list IPV4_ACL_000 on Ve 171 at Egress (From User)
  seq 10 deny ip host 0.0.0.0 host 10.0.0.0 (Active)
```

The following example displays all interfaces on which an IPv6 ACL is applied in the incoming direction.

```
device# show access-list ipv6 distList in
ipv6 access-list distList on Ethernet 1/4 at Ingress (From User)
  seq 10 deny 2001:125:132:35::/64 (Active)
  seq 20 deny 2001:54:131::/64 (Active)
  seq 30 deny 2001:5409:2004::/64 (Active)
  seq 40 permit any (Active)
```

The following example displays all ACLs applied on a specified interface in the incoming direction.

```
device# show access-list interface ethernet 1/4 in
ipv6 access-list ipv6-std-acl on Ethernet 1/4 at Ingress (From User)
  seq 10 permit host 0:1::1 (Active)
  seq 20 deny 0:2::/64 (Active)
  seq 30 hard-drop any count (Active)
```

The following example displays IPv6 receive-path ACL information.

```
device# show access-list receive ipv6
ipv4 access-list extended ipv6-receive-acl-example
seq 76 deny ip 10.10.95.10 0.0.0.0 any count (Active)

ipv6 access-list extended ipv6-receive-acl-example
seq 10 deny ipv6 3001:2010:145:35::/64 any count (Active)
```

## History

Release version	Command history
16r1.00	This command was introduced.

# show access-list-log buffer

Displays the contents of the log buffer for all ACLs, or for a specified interface.

## Syntax

```
show access-list-log buffer [ interface { ethernet slot / port | port-channel index } ]
```

## Parameters

### interface

Filters by interface.

### ethernet

Specifies a physical Ethernet interface.

#### *slot*

Specifies a valid slot number.

#### *port*

Specifies a valid port number.

### port-channel *index*

Specifies a port-channel interface.

## Modes

Privileged EXEC mode

## Command Output

The **show access-list log buffer** command displays the following information:

Output field	Description
Frames Logged on interface	Accumulated number of packets matching ACL rules applied to the interface
Ethernet Src, Dst; Internet proto, Src, Dst	Information for matched buffered packets for the specified source and destination addresses

## Examples

Sample terminal output:

```
device# show access-list-log buffer
Frames Logged on interface 1/2 :
-----
Frame Received Time : Fri Dec 9 3:8:48 2011
Ethernet,          Src : (00:34:56:78:0a:ab), Dst: (00:12:ab:54:67:da)
  Ethtype           : 0x8100
  Vlan tag type     : 0x800
  VlanID            : 0x1
Internet proto, Src : 192.85.1.2, Dst: 192.0.0.1
  Interface         :
  Type of service   : 0
  Length            : 110
  Identification    : 0
  Fragmentation     : 00 00
  TTL               : 255
  protocol          : 253
  Checksum          : 39 3a
  Payload type      :
packet(s) repeated : 30
Ingress Deny Logged
-----
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show access-list-log buffer config

Displays the configuration of the ACL buffer.

## Syntax

```
show access-list-log buffer config
```

## Modes

Privileged EXEC mode

## Command Output

The **show access-list log buffer config** command displays the following information:

Output field	Description
ACL Logging is	Displays "enabled" or "disabled".
Buffer exists	Displays interfaces buffered.
Buffer type is	Displays "circular" or "linear".

## Examples

The following example displays the configuration of the ACL buffer.

```
device# show access-list-log buffer config
ACL Logging is enabled
Buffer exists for interface Eth 2/11
Buffer type is Circular and size is 1000
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show access-list overlay transit

Displays which overlay ACL is bound with overlay transit.

## Syntax

```
show access-list overlay transit overlay_transit_name
```

## Parameters

*overlay\_transit\_name*

Specifies the name of the overlay transit.

## Modes

Privileged EXEC mode

## Examples

```
device# show access-list overlay transit tr_name
Overlay Transit Global Binding
  Inbound access-list is abc_ext (From User)
  Outbound access-list is not set
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show access-list overlay type vxlan acl-name

Displays the status of individual filters and binding information of an ACL.

## Syntax

`show access-list overlay type vxlan acl-name user-acl-name`

## Parameters

*user-acl-name*

The overlay VXLAN ACL name.

## Modes

Privileged EXEC mode

## Examples

```
device# show access-list overlay type vxlan acl-name abc_ext
Number of Rules: 4
seq 1000 permit dst-vtep-ip-host 200.1.1.1 src-vtep-ip-host 150.1.1.1 vni 1 vni-mask 0 redirect
Ethernet 2/65 sflow count 44024774(pkts)/52829728800(bytes)
seq 1010 permit dst-vtep-ip-host 200.1.1.2 src-vtep-ip-host 150.1.1.2 vni 2 vni-mask 0 redirect
Ethernet 2/19 sflow count 44024773(pkts)/52829727600(bytes)
seq 1020 permit dst-vtep-ip-host 200.1.1.3 src-vtep-ip-host 150.1.1.3 vni 3 vni-mask 0 redirect
Ethernet 2/43 sflow count 0(pkts)/0(bytes)
seq 1030 permit dst-vtep-ip-host 200.1.1.4 src-vtep-ip-host 150.1.1.4 vni 4 vni-mask 0 redirect
Ethernet 2/67 sflow count 0(pkts)/0(bytes)
Transit : transit_name
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show arp

Displays the Address Resolution Protocol (ARP) entries.

## Syntax

```
show arp { ethernet slot / port | ve ve-id } [ vrf name ]
```

```
show arp ip ip-address [ vrf name ]
```

```
show arp [ dynamic | static ] [ summary ] [ vrf name ]
```

## Parameters

### ethernet

Specifies a physical Ethernet interface.

#### slot

Specifies a valid slot number.

#### port

Specifies a valid port number.

### ve ve-id

Specifies a virtual Ethernet (VE) interface.

### vrf name

Specifies the name of the VRF instance. If this option is not used, details for the default VRF are shown in the output.

### ip ip-address

Specifies a next-hop IP address.

### dynamic

Displays all the dynamic ARP entries in the ARP table.

### static

Displays all the static ARP entries in the ARP table.

### summary

Displays a summary of the ARP table.

## Modes

Privileged EXEC mode

## Command Output

The **show arp** command displays the following information:

Output field	Description
Address	Displays the IP address.
Mac-address	Displays the MAC address or "UnResolved".
Interface	Displays the physical or VE interface.

Output field	Description
MacResolved	Indicates if the record is listed in the MAC-address table. For a physical interface, displays "yes." For a VE, displays "yes" or "no".
Age	In hh:mm:ss format, displays the time since the most recent renewal of a dynamic entry. For a static entry, displays "Never".
Type	Displays "Dynamic", "Static", or "PreArp". ("PreArp" is ARP triggered other than by the data traffic, for example, by the static route.)

## Examples

The following example displays the output of the basic **show arp** command.

```
device# show arp
Address      Mac-address      Interface      MacResolved    Age             Type
-----
11.1.1.20    UnResolved       Eth 3/14       yes            00:00:00       PreArp
12.1.1.20    UnResolved       Ve 10          no             00:00:00       PreArp
11.1.1.111   0610.9427.a001   Eth 3/14       yes            00:01:27       Dynamic
12.1.1.111   0410.9428.0002   Ve 10          yes            00:01:21       Dynamic
11.1.1.141   0000.0011.0141   Eth 3/14       yes            Never           Static
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# show arp access-list

Displays one or all Address Resolution Protocol (ARP) access control lists (ACLs) available on a device, including permit statements.

## Syntax

```
show arp access-list [ acl-name ]
```

## Parameters

*acl-name*

Specifies the name of an ARP ACL defined on the device.

## Modes

Privileged EXEC mode

## Examples

The following example displays the name and permit statements of an ARP ACL named "list1".

```
device# show arp access-list list1
ARP access list list1
  permit ip host 192.85.1.2 mac host 0010.9400.0002
  permit ip host 192.85.1.3 mac host 0010.9400.0003 log
  permit ip host 196.2.1.2 mac host 0020.3200.0008
```

The following example displays the name and permit statements of all ARP ACLs.

```
device# show arp access-list
ARP access list list1
  permit ip host 192.85.1.2 mac host 0010.9400.0002
  permit ip host 192.85.1.3 mac host 0010.9400.0003 log
  permit ip host 196.2.1.2 mac host 0020.3200.0008
ARP access list list2
  permit ip host 20.20.20.1 mac host 0011.9400.0001 log
  permit ip host 30.30.30.1 mac host 0011.9400.0002
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# show bfd

Displays Bidirectional Forwarding Detection (BFD) information.

## Syntax

**show bfd**

## Modes

User EXEC mode

## Command Output

The **show bfd** command displays the following information on a stackable switch:

Output field	Description
BFD State	Specifies whether BFD is enabled or disabled on the device.
Version	Specifies the version of the BFD protocol operating on the device.
Supported Protocols	Specifies the protocols that are registered for the particular session.
All Sessions	
Current	The number of BFD sessions currently operating on the device.
Max Allowed	The maximum number of BFD sessions that are allowed on the device. The maximum number of sessions supported on a device is 250.
Max Exceeded Count	The number of times the request to set up a BFD session was declined because it would have resulted in exceeding the maximum number of BFD sessions allowed on the device.
Port	The port on which BFD is enabled. Entry for a port will be displayed only if it has at least one session on that interface.
MinTx	The interval in milliseconds between which the device desires to send a BFD message from this port to its peer.
MinRx	The interval in milliseconds that this device desires to receive a BFD message from its peer on this port.
Mult	The number of times that the device will wait for the MinRx time on this port before it determines that its peer device is nonoperational.
Sessions	The number of BFD sessions originating on this port.

The **show bfd** command displays the following information on a chassis:

Output field	Description
BFD State	Specifies whether BFD is enabled or disabled on the device.
Version	Specifies the version of the BFD protocol operating on the device.
Supported Protocols	Specifies the protocols that are registered for the particular session.
All Sessions	
Current	The number of BFD sessions currently operating on the device.
Max Allowed	The maximum number of BFD sessions that are allowed on the device. The maximum number of sessions supported on a device is 250.

Output field	Description
Max Exceeded Count	The number of times the request to set up a BFD session was declined because it would have resulted in exceeding the maximum number of BFD sessions allowed on the device.
Agent sessions:	
Maximum Allowed on LC	The maximum number of BFD sessions that are allowed on an interface module. The maximum number of sessions supported on a line card module is 40.
Maximum Exceeded count for LCs	The number of times the request to set up a BFD session was declined because it would have resulted in exceeding the maximum number of BFD sessions allowed on an interface module.
LC	The number of the interface module for which the Current Session Count is displayed.
Tx/Rx Sessions	The number of Transmit (Tx) and Receive (Rx) BFD sessions currently operating on the specified interface module.
BFD Enabled ports count	The number of ports on the device that have been enabled for BFD.
Port	The port on which BFD is enabled. Entry for a port will be displayed only if it has at least one session on that interface.
MinTx	The interval in milliseconds between which the device desires to send a BFD message from this port to its peer.
MinRx	The interval in milliseconds that this device desires to receive a BFD message from its peer on this port.
Mult	The number of times that the device will wait for the MinRx time on this port before it determines that its peer device is nonoperational.
Sessions	The number of BFD sessions originating on this port.

## Examples

The following example shows sample output from the **show bfd** command.

```
device# show bfd

BFD State: ENABLED, Version: 1
Current Registered Protocols: ospf, Tunnel
All Sessions: Current: 4 Max Allowed: 250 Max Exceeded Count: 0
Agent Sessions: Max Allowed on LC: 40 Max Exceeded Count for LCs: 0
Port      MinTx   MinRx   Mult   Sessions
Eth 0/1/2 100    100    3      2
```

## History

Release version	Command history
17r.1.01	This command was introduced.

# show bfd neighbors application

Displays Bidirectional Forwarding Detection (BFD) neighbor session information.

## Syntax

```
show bfd neighbors application { bgp | isis | ospf | ospf6 [ details ] }
```

## Parameters

### bgp

Specifies Border Gateway Protocol (BGP) sessions.

### isis

Specifies Intermediate System to Intermediate System (IS-IS) sessions.

### ospf

Specifies Open Shortest Path First (OSPF) sessions.

### ospf6

Specifies Open Shortest Path First version 3 (OSPFv3) sessions.

### details

Displays detailed neighbor session information.

## Modes

User EXEC mode

## Command Output

The **show bfd neighbors application** command displays the following information:

Output field	Description
OurAddr	Specifies the source IP address of the interface on which this BFD session is running.
NeighAddr	The IPv4 or IPv6 address of the remote neighbor.
State	The current state of the BFD session: <ul style="list-style-type: none"> <li>• UP</li> <li>• DOWN</li> <li>• A.DOWN - The administrative down state.</li> <li>• INIT - The initialization state.</li> <li>• UNKNOWN - The current state is unknown.</li> </ul>
Int	Specifies the interface on which the BFD session is running.

## Examples

The following example shows sample output from the **show bfd neighbors application** command when the **ospf** and **details** keywords are used.

```
device# show bfd neighbors application ospf details

Flags: * indicates State is inconsistent across the cluster
OurAddr      NeighAddr    State        Int
=====      =====      =====      ===
7.7.7.1      7.7.7.2      UP           Eth 0/1/2

Local      State: UP   Diag: 0   Demand mode: 0   Poll: 0
Received  State: UP   Diag: 0   Demand mode: 0   Poll: 0   Final: 0
Local    MinTxInt(ms): 1000   MinRxInt(ms): 1000   Multiplier: 5
Received MinTxInt(ms): 1000   MinRxInt(ms): 1000   Multiplier: 5
  Rx Count: 3806   Tx Count: 4308
  LD/RD: 10001/10001   Heard from Remote: Y
Current Registered Protocols: ospf
Uptime: 0 day 0 hour 0 min 0 sec 0 msec
```

## History

Release version	Command history
17r.1.01	This command was introduced.

# show bfd neighbors dest-ip

Displays Bidirectional Forwarding Detection (BFD) neighbor information about destination devices.

## Syntax

```
show bfd neighbors dest-ip { ip-address | ipv6-address } [ details ]
```

```
show bfd neighbors dest-ip { ip-address | ipv6-address } interface { ethernet slot/port | loopback number | ve ve-interface-number }
```

## Parameters

*ip-address*

Specifies the IP address of the destination device.

*ipv6-address*

Specifies the IPv6 address of the destination device.

**details**

Displays detailed neighbor information about the destination device.

**interface**

Displays BFD neighbor interface information.

**ethernet** *slot/port*

Specifies an Ethernet slot and port.

**loopback** *number*

Specifies a loopback interface. Valid values range from 1 through 255.

**ve** *ve-interface-number*

Specifies a virtual Ethernet (VE) interface.

## Modes

User EXEC mode

## Command Output

The **show bfd neighbors dest-ip** command displays the following information:

Output field	Description
OurAddr	Specifies the source IP address of the interface on which this BFD session is running.
NeighAddr	The IPv4 or IPv6 address of the remote neighbor.
State	The current state of the BFD session: <ul style="list-style-type: none"> <li>• UP</li> <li>• DOWN</li> <li>• A.DOWN - The administrative down state.</li> <li>• INIT - The initialization state.</li> <li>• UNKNOWN - The current state is unknown.</li> </ul>

Output field	Description
Int	Specifies the interface on which the BFD session is running.

## Examples

The following example shows sample output from the **show bfd neighbors dest-ip** command.

```
device# show bfd neighbors dest-ip 10.1.1.6
```

The following example shows sample output from the **show bfd neighbors dest-ip** command when the **details** keyword is used.

```
device# show bfd neighbors dest-ip 1.1.1.6 details
```

## History

Release version	Command history
17r.1.01	This command was introduced.

# show bfd neighbors details

Displays detailed Bidirectional Forwarding Detection (BFD) neighbor information.

## Syntax

```
show bfd neighbors details
```

## Modes

User EXEC mode

## Command Output

The **show bfd neighbors details** command displays the following information:

Output field	Description
OurAddr	Specifies the source IP address of the interface on which this BFD session is running.
NeighAddr	Specifies the IPv4 address of the remote neighbor.
State	Specifies the current state of the BFD session: <ul style="list-style-type: none"> <li>• UP</li> <li>• DOWN</li> <li>• A.DOWN - The administrative down state.</li> <li>• INIT - The initialization state.</li> <li>• UNKNOWN - The current state is unknown.</li> </ul>
Int	Specifies the interface on which the BFD session is running.
Local:	
State	State of the local device.
Diag	Value of the diagnostic field in the BFD control message as used by the device in the last message sent.
Demand mode	Value of the demand in the BFD control message as used by the device in the last message received.
Poll	Value of the poll in the BFD control message as used by the device in the last message sent or received.
Received	
State	State of the remote device.
Diag	Value of the diagnostic field in the BFD control message as used by the device in the last message received.
Demand mode	Value of the demand in the BFD control message as used by the device in the last message received.
Poll	Value of the poll in the BFD control message as used by the device in the last message received.
Final	Value of the final bit in the BFD control message as used by the device in the last message received.
Local	The local device
MinTxInt(ms)	The interval in milliseconds between which the device will send a BFD message from this local neighbor port to its peer.



Output field	Description
MinRxIntMinTxInt(ms)	The interval in milliseconds that the neighbor device waits to receive a BFD message from its peer on this local port.
Multiplier	The number of times that the neighbor device will wait for the MinRxInterval time on this port before it determines that its peer device is nonoperational.
Received	
MinTxInt(ms)	The interval in milliseconds between which the device will send a BFD message from the remote neighbor port to its peer.
MinRxIntMinTxInt(ms)	The interval in milliseconds that the neighbor device waits to receive a BFD message from its peer on this remote port.
Multiplier	The number of times that the remote neighbor device will wait for the MinRxInterval time on this port before it determines that its peer device is nonoperational.
Rx Count	Total number of BFD control messages received from the remote peer.
Tx Count	Total number of BFD control messages sent to the remote peer.
LD/RD	Local and remote descriptor
Heard from Remote	Indicates remote BFD neighbor has been heard.
Current Registered Protocols	Specifies the protocols that are registered for the particular session.
Uptime	The amount of time the BFD session has been in the up state.

## Examples

The following example shows sample output from the **show bfd neighbors details** command.

```
device# show bfd neighbors details
```

## History

Release version	Command history
17r.1.01	This command was introduced.

# show bfd neighbors interface

Displays Bidirectional Forwarding Detection (BFD) neighbor information about specified interfaces.

## Syntax

```
show bfd neighbors interface { ethernet slot/port | loopback number | tunnel number | ve ve-interface-number } [ details ]
```

## Parameters

**ethernet** *slot/port*

Specifies an Ethernet slot and port.

**loopback** *number*

Specifies a loopback interface. Valid values range from 1 through 255.

**tunnel** *number*

Specifies a tunnel interface. Valid values range from 1 through 100000.

**ve** *ve-interface-number*

Specifies a virtual Ethernet (VE) interface.

**details**

Specifies detailed information.

## Modes

User EXEC mode

## Command Output

The **show bfd neighbors interface** command displays the following information:

Output field	Description
OurAddr	Specifies the source IP address of the interface on which this BFD session is running.
NeighAddr	The IPv4 or IPv6 address of the remote neighbor.
State	The current state of the BFD session: <ul style="list-style-type: none"> <li>• UP</li> <li>• DOWN</li> <li>• A.DOWN - The administrative down state.</li> <li>• INIT - The initialization state.</li> <li>• UNKNOWN - The current state is unknown.</li> </ul>
Int	Specifies the interface on which the BFD session is running.

## Examples

The following example shows sample output from the **show bfd neighbors interface** command when the **ve** keyword is used.

```
device# show bfd neighbors interface ve 5
```

The following example shows sample output from the **show bfd neighbors interface** command when the **ve** and **details** keywords are used.

```
device# show bfd neighbors interface ve 5 details
```

The following example shows sample output from the **show bfd neighbors interface** command when the **ethernet** keyword is used.

```
device# show bfd neighbors interface ethernet 0/4
```

## History

Release version	Command history
17r.1.01	This command was introduced.

# show bfd neighbors

Displays Bidirectional Forwarding Detection (BFD) neighbor information.

## Syntax

```
show bfd neighbors [ vrf vrfname [ details ] ]
```

## Parameters

**vrf** *vrfname*

Specifies the name of a nondefault VRF instance.

**details**

Displays detailed neighbor information.

## Modes

User EXEC mode

## Command Output

The **show bfd neighbors** command displays the following information:

Output field	Description
OurAddr	Specifies the source IP address of the interface on which this BFD session is running.
NeighAddr	The IPv4 or IPv6 address of the remote neighbor.
State	The current state of the BFD session: <ul style="list-style-type: none"> <li>• UP</li> <li>• DOWN</li> <li>• A.DOWN - The administrative down state.</li> <li>• INIT - The initialization state.</li> <li>• UNKNOWN - The current state is unknown.</li> </ul>
Int	Specifies the interface on which the BFD session is running.

## Examples

The following example shows sample output from the **show bfd neighbors** command.

```
device# show bfd neighbors

Flags: * indicates State is inconsistent across the cluster
OurAddr    NeighAddr  State      Int
=====
7.7.7.1    7.7.7.2    UP         Eth 0/1/2
```

## History

Release version	Command history
17r.1.01	This command was introduced.

# show bgp evpn l2route

Displays BGP EVPN Layer 2 route information in the MAC VRF table.

## Syntax

```
show bgp evpn l2route [ type { inclusive-multicast | mac } [ detail ] ]
```

## Modes

Privileged EXEC mode

## Examples

The following example shows routes in the VPN table.

```
device# show bgp evpn l2route
Total number of BGP EVPN Routes : 5
Status codes: s suppressed, d damped, h history, * valid, > best, i internal, S stale
Origin codes: i - IGP, e - EGP, ? - incomplete
   Network           Next Hop           MED           LocPrf       Weight Path
Route Distinguisher: 3.3.100.3:1
*>  IMR:[50][IPv4:3.3.100.3]
      0.0.0.0           0                 100           0             ?
*>i  IMR:[50][IPv4:4.4.100.4]
      4.4.100.4        0                 100           0             ?
*>i  IMR:[50][IPv4:5.5.100.5]
      5.5.100.5        0                 100           0             ?
*>  MAC:[50][0000.0300.0050]
      0.0.0.0           0                 100           0             ?
*>i  MAC:[50][0000.0400.0050]
      4.4.100.4        0                 100           0             ?
```

The following example displays details for inclusive-multicast routes. In this example, the EVPN instance is configured with route-targets configured automatically.

```

device# show bgp evpn l2route type inclusive-multicast detail
Total number of BGP EVPN IMR Routes : 3
Status A:AGGREGATE B:BEST b:NOT-INSTALLED-BEST C:CONFED_EBGP D:DAMPED
      E:EBGP H:HISTORY I:IBGP L:LOCAL M:MULTIPATH m:NOT-INSTALLED-MULTIPATH
      S:SUPPRESSED F:FILTERED s:STALE
Route Distinguisher: 3.3.100.3:1
1 Prefix: IMR:[50][IPv4:3.3.100.3], Status: BL, Age: 0h8m46s
  NEXT_HOP: 0.0.0.0, Learned from Peer: Local Router
  LOCAL_PREF: 100, MED: 0, ORIGIN: incomplete, Weight: 0
  AS_PATH:
    Extended Community: ExtCom:03:0c:00:00:00:00:00:08
    PMSI Attribute Flags: 0x00000000 Label-Stack: 0x00000032 Tunnel-Type: 0x00000006 Tunnel-
IP: 3.3.100.3
  Extended Community: ExtCom: Tunnel Encapsulation (Type Vxlan)
  L2_vni: 50
  RD: 3.3.100.3:1
2 Prefix: IMR:[50][IPv4:4.4.100.4], Status: BI, Age: 0h2m43s
  NEXT_HOP: 4.4.100.4, Learned from Peer: 4.4.100.4 (100)
  LOCAL_PREF: 100, MED: 0, ORIGIN: incomplete, Weight: 0
  AS_PATH:
    Extended Community: ExtCom:03:0c:00:00:00:00:00:08 RT 25600:838860816 RT 100:50
    PMSI Attribute Flags: 0x00000000 Label-Stack: 0x00000032 Tunnel-Type: 0x00000006 Tunnel-
IP: 4.4.100.4
  Extended Community: ExtCom: Tunnel Encapsulation (Type Vxlan)
  L2_vni: 50
  RD: 3.3.100.3:1
3 Prefix: IMR:[50][IPv4:5.5.100.5], Status: BI, Age: 0h2m37s
  NEXT_HOP: 5.5.100.5, Learned from Peer: 5.5.100.5 (100)
  LOCAL_PREF: 100, MED: 0, ORIGIN: incomplete, Weight: 0
  AS_PATH:
    Extended Community: ExtCom:03:0c:00:00:00:00:00:08 RT 25600:838860816 RT 100:50
    PMSI Attribute Flags: 0x00000000 Label-Stack: 0x00000032 Tunnel-Type: 0x00000006 Tunnel-
IP: 5.5.100.5
  Extended Community: ExtCom: Tunnel Encapsulation (Type Vxlan)
  L2_vni: 50
  RD: 3.3.100.3:1

```

The following example displays details for inclusive-multicast routes. In this example, the EVPN instance is configured with route-targets configured explicitly.

```
device# show bgp evpn l2route type inclusive-multicast detail
Total number of BGP EVPN IMR Routes : 2
Status A:AGGREGATE B:BEST b:NOT-INSTALLED-BEST C:CONFED_EBGP D:DAMPED
      E:EBGP H:HISTORY I:IBGP L:LOCAL M:MULTIPATH m:NOT-INSTALLED-MULTIPATH
      S:SUPPRESSED F:FILTERED s:STALE
Route Distinguisher: 3.3.100.3:1
1     Prefix: IMR:[50][IPv4:3.3.100.3], Status: BL, Age: 0h4m17s
      NEXT_HOP: 0.0.0.0, Learned from Peer: Local Router
      LOCAL_PREF: 100, MED: 0, ORIGIN: incomplete, Weight: 0
      AS_PATH:
        Extended Community: ExtCom:03:0c:00:00:00:00:00:08
        PMSI Attribute Flags: 0x00000000 Label-Stack: 0x00000032 Tunnel-Type: 0x00000006 Tunnel-
IP: 3.3.100.3
        Extended Community: ExtCom: Tunnel Encapsulation (Type Vxlan)
        L2_vni: 50
        RD: 3.3.100.3:1
2     Prefix: IMR:[50][IPv4:4.4.100.4], Status: BI, Age: 0h3m31s
      NEXT_HOP: 4.4.100.4, Learned from Peer: 4.4.100.4 (100)
      LOCAL_PREF: 100, MED: 0, ORIGIN: incomplete, Weight: 0
      AS_PATH:
        Extended Community: ExtCom:03:0c:00:00:00:00:00:08 RT 50:1
        PMSI Attribute Flags: 0x00000000 Label-Stack: 0x00000032 Tunnel-Type: 0x00000006 Tunnel-
IP: 4.4.100.4
        Extended Community: ExtCom: Tunnel Encapsulation (Type Vxlan)
        L2_vni: 50
        RD: 3.3.100.3:1
```

The following example displays details for MAC routes. **BI** indicates that the route is "Best" and "Installed." This ensures that it is downloaded into the system.

```
device# show bgp evpn l2route type mac detail
Total number of BGP EVPN MAC Routes : 1
Status A:AGGREGATE B:BEST b:NOT-INSTALLED-BEST C:CONFED_EBGP D:DAMPED
      E:EBGP H:HISTORY I:IBGP L:LOCAL M:MULTIPATH m:NOT-INSTALLED-MULTIPATH
      S:SUPPRESSED F:FILTERED s:STALE
Route Distinguisher: 01:00:04:03:02:01:01:00
1     Prefix: MAC:[100][1111.2222.3333], Status: BI, Age: 0h6m17s
      NEXT_HOP: 10.20.30.40, Learned from Peer: 10.0.0.2 (100)
      LOCAL_PREF: 100, MED: 0, ORIGIN: incomplete, Weight: 0
      AS_PATH:
        Extended Community: ExtCom:03:0c:00:00:00:00:08:00 RT 25600:1677721600
        Extended Community: ExtCom: Tunnel Encapsulation (Type Vxlan)
        L2_vni: 100
        ESI : 00.00000000000000000000
        RD: 01:00:04:03:02:01:01:00
```

## History

Release version	Command history
17r.1.01	This command was introduced.



# show bgp evpn neighbors

Displays configuration information for BGP EVPN neighbors of the device.

## Syntax

```
show bgp evpn neighbors [ ip-addr | ipv6-addr | routes-summary ]
```

## Parameters

*ip-addr*

Specifies the IPv4 address of a neighbor.

*ipv6-addr*

Specifies the IPv6 address of a neighbor.

**routes-summary**

Displays routes received, routes accepted, number of routes advertised by peer, and so on.

## Modes

Privileged EXEC mode

## Usage Guidelines

Use this command to view configuration information and statistics for BGP EVPN neighbors of the device. Output shows all configured parameters for the neighbors.

## Examples

The following example shows sample output from the show bgp evpn neighbors command.

```
device# show bgp evpn neighbors
```

## History

Release version	Command history
17r.1.01	This command was introduced.

# show bgp evpn neighbors advertised-routes

Displays information about the routes that the device has advertised to the specified neighbor during the current BGP EVPN session.

## Syntax

```
show bgp evpn neighbors { ip address | ipv6 address } advertised-routes [ detail [ type ] | type ]
```

## Parameters

*ip-addr*

Specifies the IPv4 address of a neighbor.

*ipv6-addr*

Specifies the IPv6 address of a neighbor.

**detail** *type*

Specifies detailed information be given for the designated route type.

**type**

Specifies the type of route.

**auto-discovery**

Specifies automatically discovered routes.

**ethernet-segment**

Specifies Ethernet Segment (ES) routes.

**inclusive-multicast**

Specifies inclusive multicast routes.

**ipv4-prefix**

Specifies IPv4 prefix routes.

**ipv6-prefix**

Specifies IPv6 prefix routes.

**mac**

Specifies MAC routes.

## Modes

Privileged EXEC mode

## Examples

The following example shows output for the **show bgp evpn neighbors advertised-routes detail** command.

```
device# show bgp evpn neighbors 2.0.0.2 advertised-routes detail

There are 5812 routes advertised to neighbor 2.0.0.2
Status A:AGGREGATE B:BEST b:NOT-INSTALLED-BEST E:EBGP I:IBGP L:LOCAL
1 Prefix: ARP:[0][0000.abba.baba]:[IPv4:2.29.1.254], Status: BE, Age: 1d6h1m40s
  NEXT_HOP: 19.0.0.19, Learned from Peer: 200.1.1.76 (65003)
  LOCAL_PREF: none, MED: none, ORIGIN: incomplete, Weight: 0
  AS_PATH: 65009 65003
  Extended Community: ExtCom:03:0d:00:00:00:00:00:00:00:00:00:00:08 RT
65003:29 RT 2:2 RT 65003:20 ExtCom:06:03:50:eb:1a:13:17:9a
  Default Extd Gw Community: Received
  Extended Community: ExtCom: Tunnel Encapsulation (Type Vxlan)
  Adj_RIB_out count: 2, Admin distance 20
  L2_vni: 29 L3_vni: 20 Router Mac : 50:eb:1a:13:17:9a
  ESI : 00.00000000000000000000
2 Prefix: ND:[0][0000.abba.abba]:[IPv6:2:29:1::254], Status: BE, Age: 1d6h1m40s
  NEXT_HOP: 19.0.0.19, Learned from Peer: 200.1.1.76 (65003)
  LOCAL_PREF: none, MED: none, ORIGIN: incomplete, Weight: 0
  AS_PATH: 65009 65003
  Extended Community: ExtCom:03:0d:00:00:00:00:00:00:00:00:00:00:08 RT
65003:29 RT 2:2 RT 65003:20 ExtCom:06:03:50:eb:1a:13:17:9a
  Default Extd Gw Community: Received
  Extended Community: ExtCom: Tunnel Encapsulation (Type Vxlan)
  Adj_RIB_out count: 2, Admin distance 20
  L2_vni: 29 L3_vni: 20 Router Mac : 50:eb:1a:13:17:9a
  ESI : 00.00000000000000000000
3 Prefix: MAC:[0][50eb.1a13.8074], Status: BE, Age: 1d6h1m35s
  NEXT_HOP: 76.0.0.76, Learned from Peer: 200.1.1.76 (65003)
  LOCAL_PREF: none, MED: none, ORIGIN: incomplete, Weight: 0
  AS_PATH: 65009 65003
  Extended Community: ExtCom:06:00:01:00:00:00:00:00:00:00:00:00:00 ExtCom:
03:0c:00:00:00:00:08 RT 65003:136
  Mac Mobility Sticky: True
  Default Extd Gw Community: Received
  Extended Community: ExtCom: Tunnel Encapsulation (Type Vxlan)
  Adj_RIB_out count: 2, Admin distance 20
  L2_vni: 136
  ESI : 00.00000000000000000000
4 Prefix: MAC:[0][0000.abba.baba], Status: BE, Age: 1d6h1m35s
  NEXT_HOP: 76.0.0.76, Learned from Peer: 200.1.1.76 (65003)
  LOCAL_PREF: none, MED: none, ORIGIN: incomplete, Weight: 0
  AS_PATH: 65009 65003
  Extended Community: ExtCom:06:00:01:00:00:00:00:00:00:00:00:00:00 ExtCom:
03:0c:00:00:00:00:08 RT 65003:136
  Mac Mobility Sticky: True
  Default Extd Gw Community: Received
  Extended Community: ExtCom: Tunnel Encapsulation (Type Vxlan)
  Adj_RIB_out count: 2, Admin distance 20
  L2_vni: 136
  ESI : 00.00000000000000000000
5 Prefix: MAC:[0][0000.abba.abba], Status: BE, Age: 1d6h1m35s
  NEXT_HOP: 76.0.0.76, Learned from Peer: 200.1.1.76 (65003)
  LOCAL_PREF: none, MED: none, ORIGIN: incomplete, Weight: 0
  AS_PATH: 65009 65003
  Extended Community: ExtCom:06:00:01:00:00:00:00:00:00:00:00:00:00 ExtCom:
03:0c:00:00:00:00:08 RT 65003:136
  Mac Mobility Sticky: True
  Default Extd Gw Community: Received
  Extended Community: ExtCom: Tunnel Encapsulation (Type Vxlan)
  Adj_RIB_out count: 2, Admin distance 20
  L2_vni: 136
  ESI : 00.00000000000000000000
...
```

show bgp evpn neighbors advertised-routes

## History

Release version	Command history
17r.1.01	This command was introduced.

# show bgp evpn neighbors routes

Displays routes of specified types received from designated BGP EVPN neighbors, for example, best BGP EVPN routes to their destination.

## Syntax

```
show bgp evpn neighbors { ip address | ipv6 address } routes [ type ] | best [ type ] | detail [ type ] | not-installed-best [ type ] | unreachable [ type ]
```

## Parameters

### type

Specifies the type of route.

### auto-discovery

Specifies automatically discovered routes.

### ethernet-segment

Specifies Ethernet Segments (ES) routes.

### inclusive-multicast

Specifies inclusive multicast routes.

### mac

Specifies MAC routes.

## Modes

Privileged EXEC mode

## Examples

The following example shows output for the **show bgp evpn neighbors routes best** command.

```
device# show bgp evpn neighbors 2.0.0.2 routes best

Status A:AGGREGATE B:BEST b:NOT-INSTALLED-BEST C:CONFED_EBGP D:DAMPED
E:EBGP H:HISTORY I:IBGP L:LOCAL M:MULTIPATH m:NOT-INSTALLED-MULTIPATH
S:SUPPRESSED F:FILTERED s:STALE
Prefix      Next Hop      MED      LocPrf      Weight      Status
1  IMR:[0][IPv4:57.0.0.57]
      57.0.0.57      0      100      0      BE
      AS_PATH: 65002 65006
      L2_vni: 22
2  ARP:[0][0000.abba.baba]:[IPv4:2.22.1.254]
      57.0.0.57      0      100      0      BE
      AS_PATH: 65002 65006
      L2_vni: 22 L3_vni: 0
      ESI : 00.00000000000000000000
3  ND:[0][0000.abba.abba]:[IPv6:2:22:1::254]
      57.0.0.57      0      100      0      BE
      AS_PATH: 65002 65006
      L2_vni: 22 L3_vni: 0
      ESI : 00.00000000000000000000
4  ND:[0][0027.f8ca.76ba]:[IPv6:fe80::227:f8ff:feca:76ba]
      57.0.0.57      0      100      0      BE
      AS_PATH: 65002 65006
      L2_vni: 22 L3_vni: 0
      ESI : 00.00000000000000000000
5  MAC:[0][0000.abba.abba]
      57.0.0.57      0      100      0      BE
      AS_PATH: 65002 65006
      L2_vni: 22
      ESI : 00.00000000000000000000
...
```

## History

Release version	Command history
17r.1.01	This command was introduced.

# show bgp evpn routes

Displays EVPN routes in the VPN table. Routes are imported into the MAC VRF table if those routes are imported.

## Syntax

```
show bgp evpn routes
```

## Modes

Privileged EXEC mode

## Examples

The following example shows routes in the VPN table.

```
device# show bgp evpn routes
Total number of BGP EVPN Routes : 5
Status codes: s suppressed, d damped, h history, * valid, > best, i internal, S stale
Origin codes: i - IGP, e - EGP, ? - incomplete
   Network           Next Hop           MED           LocPrf        Weight Path
Route Distinguisher: 3.3.100.3:32818
*>  IMR:[0][IPv4:3.3.100.3]
           3.3.100.3           0             100           0           ?
*>  MAC:[0][0000.0300.0050]
           3.3.100.3           0             100           0           ?
Route Distinguisher: 4.4.100.4:32818
*>i IMR:[0][IPv4:4.4.100.4]
           4.4.100.4           0             100           0           ?
*>i MAC:[0][0000.0400.0050]
           4.4.100.4           0             100           0           ?
Route Distinguisher: 5.5.100.5:32818
*>i IMR:[0][IPv4:5.5.100.5]
           5.5.100.5           0             100           0           ?
```

## History

Release version	Command history
17r.1.01	This command was introduced.

# show bgp evpn routes best

Displays information for BGP EVPN routes that were selected as best routes.

## Syntax

```
show bgp evpn routes best
```

```
show bgp evpn routes best [ type { auto-discovery | ethernet-segment | inclusive-multicast | ipv4-prefix | ipv6-prefix | mac } ]
```

## Parameters

### type

Specifies the type of route.

### auto-discovery

Specifies automatically discovered routes.

### ethernet-segment

Specifies Ethernet Segments (ES) routes.

### inclusive-multicast

Specifies inclusive multicast routes.

### ipv4-prefix

Specifies IPv4 prefix routes.

### ipv6-prefix

Specifies IPv6 prefix routes.

### mac

Specifies MAC routes.

## Modes

Privileged EXEC mode



## Examples

The following example shows output for the **show bgp evpn routes best** command.

```
device# show bgp evpn routes best

Status A:AGGREGATE B:BEST b:NOT-INSTALLED-BEST C:CONFED_EBGP D:DAMPED
E:EBGP H:HISTORY I:IBGP L:LOCAL M:MULTIPATH m:NOT-INSTALLED-MULTIPATH
S:SUPPRESSED F:FILTERED s:STALE
Prefix      Next Hop      MED      LocPrf      Weight      Status
1  IMR:[0][IPv4:57.0.0.57]
    57.0.0.57      0      100      0      BE
    AS_PATH: 65002 65006
    L2_vni: 22
2  ARP:[0][0000.abba.baba]:[IPv4:2.22.1.254]
    57.0.0.57      0      100      0      BE
    AS_PATH: 65002 65006
    L2_vni: 22 L3_vni: 0
    ESI : 00.00000000000000000000
3  ND:[0][0000.abba.abba]:[IPv6:2:22:1::254]
    57.0.0.57      0      100      0      BE
    AS_PATH: 65002 65006
    L2_vni: 22 L3_vni: 0
    ESI : 00.00000000000000000000
4  ND:[0][0027.f8ca.76ba]:[IPv6:fe80::227:f8ff:feca:76ba]
    57.0.0.57      0      100      0      BE
    AS_PATH: 65002 65006
    L2_vni: 22 L3_vni: 0
    ESI : 00.00000000000000000000
5  MAC:[0][0000.abba.abba]
    57.0.0.57      0      100      0      BE
    AS_PATH: 65002 65006
    L2_vni: 22
    ESI : 00.00000000000000000000
6  MAC:[0][0000.abba.baba]
    57.0.0.57      0      100      0      BE
    AS_PATH: 65002 65006
    L2_vni: 22
    ESI : 00.00000000000000000000
...
```

## History

Release version	Command history
17r.1.01	This command was introduced.

show bgp evpn routes detail

# show bgp evpn routes detail

Displays detailed BGP EVPN route information.

## Syntax

`show bgp evpn routes detail`

## Modes

Privileged EXEC mode

## Examples

The following example shows output for the **show bgp evpn routes detail** command.

```

device# show bgp evpn routes detail
Total number of BGP EVPN Routes : 12136
Status A:AGGREGATE B:BEST b:NOT-INSTALLED-BEST C:CONFED_EBGP D:DAMPED
      E:EBGP H:HISTORY I:IBGP L:LOCAL M:MULTIPATH m:NOT-INSTALLED-MULTIPATH
      S:SUPPRESSED F:FILTERED s:STALE
Route Distinguisher: 6.0.0.6:32790
1      Prefix: IMR:[0][IPv4:57.0.0.57], Status: BE, Age: 1d9h20m9s
      NEXT_HOP: 57.0.0.57, Learned from Peer: 2.0.0.2 (65002)
      LOCAL_PREF: 100, MED: none, ORIGIN: incomplete, Weight: 0
      AS_PATH: 65002 65006
      Extended Community: ExtCom:03:0c:00:00:00:00:00:08 RT 65006:22
      PMSI Attribute Flags: 0x00000000 Label-Stack: 0x00000016 Tunnel-Type: 0x00000006 Tunnel-
IP: 57.0.0.57
      Extended Community: ExtCom: Tunnel Encapsulation (Type Vxlan)
      Adj_RIB_out count: 2, Admin distance 20
      L2_vni: 22
2      Prefix: IMR:[0][IPv4:57.0.0.57], Status: E, Age: 1d9h20m9s
      NEXT_HOP: 57.0.0.57, Learned from Peer: 3.0.0.3 (65002)
      LOCAL_PREF: 100, MED: none, ORIGIN: incomplete, Weight: 0
      AS_PATH: 65002 65006
      Extended Community: ExtCom:03:0c:00:00:00:00:00:08 RT 65006:22
      PMSI Attribute Flags: 0x00000000 Label-Stack: 0x00000016 Tunnel-Type: 0x00000006 Tunnel-
IP: 57.0.0.57
      Extended Community: ExtCom: Tunnel Encapsulation (Type Vxlan)
      L2_vni: 22
3      Prefix: ARP:[0][0000.abba.baba]:[IPv4:2.22.1.254], Status: BE, Age: 1d9h19m42s
      NEXT_HOP: 57.0.0.57, Learned from Peer: 2.0.0.2 (65002)
      LOCAL_PREF: 100, MED: none, ORIGIN: incomplete, Weight: 0
      AS_PATH: 65002 65006
      Extended Community: ExtCom:03:0d:00:00:00:00:00:00 ExtCom:03:0c:00:00:00:00:08 RT
65006:22
      Default Extd Gw Community: Received
      Extended Community: ExtCom: Tunnel Encapsulation (Type Vxlan)
      Adj_RIB_out count: 2, Admin distance 20
      L2_vni: 22 L3_vni: 0
      ESI : 00.00000000000000000000
4      Prefix: ARP:[0][0000.abba.baba]:[IPv4:2.22.1.254], Status: E, Age: 1d9h19m42s
      NEXT_HOP: 57.0.0.57, Learned from Peer: 3.0.0.3 (65002)
      LOCAL_PREF: 100, MED: none, ORIGIN: incomplete, Weight: 0
      AS_PATH: 65002 65006
      Extended Community: ExtCom:03:0d:00:00:00:00:00:00 ExtCom:03:0c:00:00:00:00:08 RT
65006:22
      Default Extd Gw Community: Received
      Extended Community: ExtCom: Tunnel Encapsulation (Type Vxlan)
      L2_vni: 22 L3_vni: 0
      ESI : 00.00000000000000000000
5      Prefix: ND:[0][0000.abba.abba]:[IPv6:2:22:1::254], Status: BE, Age: 1d9h19m42s
      NEXT_HOP: 57.0.0.57, Learned from Peer: 2.0.0.2 (65002)
      LOCAL_PREF: 100, MED: none, ORIGIN: incomplete, Weight: 0
      AS_PATH: 65002 65006
      Extended Community: ExtCom:03:0d:00:00:00:00:00:00 ExtCom:03:0c:00:00:00:00:08 RT
65006:22
      Default Extd Gw Community: Received
      Extended Community: ExtCom: Tunnel Encapsulation (Type Vxlan)
      Adj_RIB_out count: 2, Admin distance 20
      L2_vni: 22 L3_vni: 0
      ESI : 00.00000000000000000000
...

```

## History

Release version	Command history
17r.1.01	This command was introduced.

# show bgp evpn routes local

Displays information about BGP EVPN local routes.

## Syntax

```
show bgp evpn routes local
```

```
show bgp evpn routes local type [ auto-discovery | ethernet-segment | inclusive-multicast | ipv4-prefix | ipv6-prefix | mac ]
```

## Parameters

### type

Specifies the type of route.

### auto-discovery

Specifies automatically discovered routes.

### ethernet-segment

Specifies Ethernet Segments (ES) routes.

### inclusive-multicast

Specifies inclusive multicast routes.

### ipv4-prefix

Specifies IPv4 prefix routes.

### ipv6-prefix

Specifies IPv6 prefix routes.

### mac

Specifies MAC routes.

## Modes

Privileged EXEC mode

## Examples

The following example shows output for the **show bgp evpn routes local** command.

```

device# show bgp evpn routes local

Status A:AGGREGATE B:BEST b:NOT-INSTALLED-BEST C:CONFED_EBGP D:DAMPED
E:EBGP H:HISTORY I:IBGP L:LOCAL M:MULTIPATH m:NOT-INSTALLED-MULTIPATH
S:SUPPRESSED F:FILTERED s:STALE
1 Prefix: AD:[00.000000000000989900][4294967295], Status: BL, Age:
1d23h
50m9s
    NEXT_HOP: 78.0.0.78, Learned from Peer: Local Router
    LOCAL_PREF: 100, MED: 0, ORIGIN: incomplete, Weight: 0
    AS_PATH:
    Extended Community: ExtCom:06:01:00:00:00:00:00:00 ExtCom:03:0c:
00:0
0:00:00:00:08
    ESI Label Ext Community: 0 All-Active
    Extended Community: ExtCom: Tunnel Encapsulation (Type Vxlan)
    Adj_RIB_out count: 2, Admin distance 0
2 Prefix: ESR:[00.000000.000000.989900][IPv4:7.0.0.7], Status: BL,
Age:
1d23h50m9s
    NEXT_HOP: 78.0.0.78, Learned from Peer: Local Router
    LOCAL_PREF: 100, MED: 0, ORIGIN: incomplete, Weight: 0
    AS_PATH:
    Extended Community: ExtCom:06:02:00:00:00:00:98:99:00 ExtCom:03:0c:
00:0
0:00:00:00:08
    RT Import 0:10000640
    Extended Community: ExtCom: Tunnel Encapsulation (Type Vxlan)
    Adj_RIB_out count: 2, Admin distance 0
3 Prefix: IP4Prefix:[0][21.1.1.0/24], Status: BL, Age: 1d23h36m46s
    NEXT_HOP: 78.0.0.78, Learned from Peer: Local Router
    LOCAL_PREF: 100, MED: 0, ORIGIN: incomplete, Weight: 0
    AS_PATH:
    Extended Community: RT 1:1 ExtCom:06:03:50:eb:1a:14:07:67 ExtCom:
03:
00:00:00:00:00:08
    Extended Community: ExtCom: Tunnel Encapsulation (Type Vxlan)
    Adj_RIB_out count: 2, Admin distance 0
    L3_vni: 10020 Router Mac : 50:eb:1a:14:07:67
4 Prefix: IP4Prefix:[0][22.1.1.0/24], Status: BL, Age: 1d23h36m46s
    NEXT_HOP: 78.0.0.78, Learned from Peer: Local Router
    LOCAL_PREF: 100, MED: 0, ORIGIN: incomplete, Weight: 0
    AS_PATH:
    Extended Community: RT 1:1 ExtCom:06:03:50:eb:1a:14:07:67 ExtCom:
03:
00:00:00:00:00:08
    Extended Community: ExtCom: Tunnel Encapsulation (Type Vxlan)
    Adj_RIB_out count: 2, Admin distance 0
    L3_vni: 10020 Router Mac : 50:eb:1a:14:07:67
...

```

This example shows output for the **show bgp evpn routes local** command when the **type** and **mac** keywords are used.

```
device# show bgp evpn routes local type mac

Status A:AGGREGATE B:BEST b:NOT-INSTALLED-BEST C:CONFED_EBGP D:DAMPED
E:EBGP H:HISTORY I:IBGP L:LOCAL M:MULTIPATH m:NOT-INSTALLED-MULTIPATH
S:SUPPRESSED F:FILTERED s:STALE
1 Prefix: MAC:[0][0000.abba.abba], Status: BL, Age: 1d9h36m12s
  NEXT_HOP: 109.0.0.109, Learned from Peer: Local Router
  LOCAL_PREF: 100, MED: 0, ORIGIN: incomplete, Weight: 0
  AS_PATH:
    Extended Community: ExtCom:06:00:01:00:00:00:00:00 ExtCom:03:0d:00:00:00:00:00:00 ExtCom:
03:0c:00:00:00:00:00:08 RT 65009:22
    Mac Mobility Sticky: True
    Default Extd Gw Community: Received
    Extended Community: ExtCom: Tunnel Encapsulation (Type Vxlan)
    Adj_RIB_out count: 3, Admin distance 0
    L2_vni: 22
    ESI : 00.00000000000000000000
2 Prefix: MAC:[0][0000.abba.baba], Status: BL, Age: 1d9h36m12s
  NEXT_HOP: 109.0.0.109, Learned from Peer: Local Router
  LOCAL_PREF: 100, MED: 0, ORIGIN: incomplete, Weight: 0
  AS_PATH:
    Extended Community: ExtCom:06:00:01:00:00:00:00:00 ExtCom:03:0d:00:00:00:00:00:00 ExtCom:
03:0c:00:00:00:00:00:08 RT 65009:22
    Mac Mobility Sticky: True
    Default Extd Gw Community: Received
    Extended Community: ExtCom: Tunnel Encapsulation (Type Vxlan)
    Adj_RIB_out count: 3, Admin distance 0
    L2_vni: 22
    ESI : 00.00000000000000000000
3 Prefix: MAC:[0][0027.f8fd.274b], Status: BL, Age: 1d9h36m32s
  NEXT_HOP: 109.0.0.109, Learned from Peer: Local Router
  LOCAL_PREF: 100, MED: 0, ORIGIN: incomplete, Weight: 0
  AS_PATH:
    Extended Community: ExtCom:06:00:01:00:00:00:00:00 ExtCom:03:0d:00:00:00:00:00:00 ExtCom:
03:0c:00:00:00:00:00:08 RT 65009:22
    Mac Mobility Sticky: True
    Default Extd Gw Community: Received
    Extended Community: ExtCom: Tunnel Encapsulation (Type Vxlan)
    Adj_RIB_out count: 3, Admin distance 0
    L2_vni: 22
    ESI : 00.00000000000000000000
...
```

## History

Release version	Command history
17r.1.01	This command was introduced.

# show bgp evpn routes next-hop

Displays information for BGP EVPN routes received from the specified next-hop.

## Syntax

```
show bgp evpn routes next-hop { ipv4-address | ipv6-address } type { auto-discovery | ethernet-segment | inclusive-multicast | ipv4-prefix | ipv6-prefix | mac }
```

## Parameters

*ipv4-address*

Specifies an IPv4 address.

*ipv6-address*

Specifies an IPv6 address.

**type**

Specifies the type of route.

**auto-discovery**

Specifies automatically discovered routes.

**ethernet-segment**

Specifies Ethernet Segments (ES) routes.

**inclusive-multicast**

Specifies inclusive multicast routes.

**ipv4-prefix**

Specifies IPv4 prefix routes.

**ipv6-prefix**

Specifies IPv6 prefix routes.

**mac**

Specifies MAC routes.

## Modes

Privileged EXEC mode

## Examples

```
device# show bgp evpn routes next-hop 57.0.0.57 type mac
```

## History

Release version	Command history
17r.1.01	This command was introduced.

# show bgp evpn routes no-best

Displays information for BGP EVPN routes that were selected as not best routes.

## Syntax

```
show bgp evpn routes no-best
```

```
show bgp evpn routes no-best [ type { auto-discovery | ethernet-segment | inclusive-multicast | ipv4-prefix | ipv6-prefix | mac } ]
```

## Parameters

### type

Specifies the type of route.

### auto-discovery

Specifies automatically discovered routes.

### ethernet-segment

Specifies Ethernet Segments (ES) routes.

### inclusive-multicast

Specifies inclusive multicast routes.

### ipv4-prefix

Specifies IPv4 prefix routes.

### ipv6-prefix

Specifies IPv6 prefix routes.

### mac

Specifies MAC routes.

## Modes

Privileged EXEC mode



## Examples

The following example shows output for the **show bgp evpn routes no-best** command.

```
device# show bgp evpn routes no-best

Status A:AGGREGATE B:BEST b:NOT-INSTALLED-BEST C:CONFED_EBGP D:DAMPED
E:EBGP H:HISTORY I:IBGP L:LOCAL M:MULTIPATH m:NOT-INSTALLED-MULTIPATH
S:SUPPRESSED F:FILTERED s:STALE
Prefix      Next Hop      MED      LocPrf      Weight Status
1  IMR:[0][IPv4:57.0.0.57]
      57.0.0.57      0      100      0      I
      AS_PATH: 65009 65002 65006
      L2_vni: 22
2  ARP:[0][0000.abba.baba]:[IPv4:2.22.1.254]
      57.0.0.57      0      100      0      I
      AS_PATH: 65009 65002 65006
      L2_vni: 22 L3_vni: 0
      ESI : 00.00000000000000000000
3  ND:[0][0000.abba.abba]:[IPv6:2:22:1::254]
      57.0.0.57      0      100      0      I
      AS_PATH: 65009 65002 65006
      L2_vni: 22 L3_vni: 0
      ESI : 00.00000000000000000000
4  ND:[0][0027.f8ca.76ba]:[IPv6:fe80::227:f8ff:feca:76ba]
      57.0.0.57      0      100      0      I
      AS_PATH: 65009 65002 65006
      L2_vni: 22 L3_vni: 0
      ESI : 00.00000000000000000000
5  MAC:[0][0000.abba.abba]
      57.0.0.57      0      100      0      I
      AS_PATH: 65009 65002 65006
      L2_vni: 22
      ESI : 00.00000000000000000000
6  MAC:[0][0000.abba.baba]
      57.0.0.57      0      100      0      I
      AS_PATH: 65009 65002 65006
      L2_vni: 22
      ESI : 00.00000000000000000000
...
```

## History

Release version	Command history
17r.1.01	This command was introduced.

# show bgp evpn routes not-installed-best

Displays information for BGP EVPN best routes that are not installed.

## Syntax

```
show bgp evpn routes not-installed-best
```

```
show bgp evpn routes not-installed-best [ type { auto-discovery | ethernet-segment | inclusive-multicast | ipv4-prefix |  
    ipv6-prefix | mac } ]
```

## Parameters

### type

Specifies the type of route.

### auto-discovery

Specifies automatically discovered routes.

### ethernet-segment

Specifies Ethernet Segments (ES) routes.

### inclusive-multicast

Specifies inclusive multicast routes.

### ipv4-prefix

Specifies IPv4 prefix routes.

### ipv6-prefix

Specifies IPv6 prefix routes.

### mac

Specifies MAC routes.

## Modes

Privileged EXEC mode

## History

Release version	Command history
17r.1.01	This command was introduced.

# show bgp evpn routes rd

Displays information for BGP EVPN routes with the specified route distinguisher (RD).

## Syntax

```
show bgp evpn routes rd ID
```

## Parameters

*ID*

Identifying number assigned to the route.

## Modes

Privileged EXEC mode

## Examples

The following example shows output for the **show bgp evpn routes rd** command.

```
device# show bgp evpn routes rd 6.0.0.6:32790

Status codes: s suppressed, d damped, h history, * valid, > best, i internal, S stale
Origin codes: i - IGP, e - EGP, ? - incomplete
  Network          Next Hop          MED          LocPrf        Weight Path
*>  IMR: [0] [IPv4:57.0.0.57]
    57.0.0.57
    100          0          65002 65006 ?
*   IMR: [0] [IPv4:57.0.0.57]
    57.0.0.57
    100          0          65002 65006 ?
*>  ARP: [0] [0000.abba.baba]: [IPv4:2.22.1.254]
    57.0.0.57
    100          0          65002 65006 ?
*   ARP: [0] [0000.abba.baba]: [IPv4:2.22.1.254]
    57.0.0.57
    100          0          65002 65006 ?
*>  ND: [0] [0000.abba.abba]: [IPv6:2:22:1::254]
    57.0.0.57
    100          0          65002 65006 ?
*   ND: [0] [0000.abba.abba]: [IPv6:2:22:1::254]
    57.0.0.57
    100          0          65002 65006 ?
*>  ND: [0] [0027.f8ca.76ba]: [IPv6:fe80::227:f8ff:feca:76ba]
    57.0.0.57
    100          0          65002 65006 ?
*   ND: [0] [0027.f8ca.76ba]: [IPv6:fe80::227:f8ff:feca:76ba]
    57.0.0.57
    100          0          65002 65006 ?
*>  MAC: [0] [0000.abba.abba]
    57.0.0.57
    100          0          65002 65006 ?
*   MAC: [0] [0000.abba.abba]
    57.0.0.57
    100          0          65002 65006 ?
*>  MAC: [0] [0000.abba.baba]
    57.0.0.57
    100          0          65002 65006 ?
*   MAC: [0] [0000.abba.baba]
    57.0.0.57
    100          0          65002 65006 ?
*>  MAC: [0] [0027.f8ca.76ba]
    57.0.0.57
    100          0          65002 65006 ?
*   MAC: [0] [0027.f8ca.76ba]
    57.0.0.57
    100          0          65002 65006 ?
```

show bgp evpn routes rd

## History

Release version	Command history
17r.1.01	This command was introduced.

# show bgp evpn routes rd type

Displays information for BGP EVPN routes, filtered based on a specified route type, with the specified route distinguisher (RD).

## Syntax

```
show bgp evpn routes rd admin-value:arbitrary-value type { auto-discovery | ethernet-segment | inclusive-multicast | ipv4-
prefix | ipv6-prefix | mac } detail

show bgp evpn routes rd admin-value:arbitrary-value type auto-discovery esi-value value ethernet-tag tag-id

show bgp evpn routes rd admin-value:arbitrary-value type ethernet-segment esi-value value { ipv4-address address | ipv6-
address address }

show bgp evpn routes rd admin-value:arbitrary-value type inclusive-multicast ethernet-tag tag-id ipv4-address address
[ l2-vni number ]

show bgp evpn routes rd admin-value:arbitrary-value type ipv4-prefix ip address/mask tag tag-id [ l3vni value ]

show bgp evpn routes rd admin-value:arbitrary-value type ipv6-prefix ipv6 address/mask tag tag-id [ l3vni value ]

show bgp evpn routes rd admin-value:arbitrary-value type mac mac address ethernet-tag tag-id [ l2-vni number ]
```

## Parameters

### *admin-value*

The administrative number assigned to the route. This can be a local ASN number or an IP address. The ASN number can be either a 2-byte number (from 0 through 65535) or a 4-byte number (from 0 through 4294967295).

### *arbitrary-value*

An arbitrary number you choose. The range of valid values is from 0 through 65535 if the ASN is 2 byte, or from 0 through 4294967295 if the ASN is 4 byte.

### **type**

Specifies a route type.

### **auto-discovery**

Specifies automatically discovered routes.

### **ethernet-segment**

Specifies Ethernet Segment (ES) information.

### **inclusive-multicast**

Specifies inclusive multicast information.

### **ipv4-prefix**

Specifies IPv4 prefix information information.

### **ipv6-prefix**

Specifies IPv6 prefix information information.

### **mac**

Specifies Media Access Control (MAC) information.

### **detail**

Displays detailed information.

**mac** *mac address*

Specifies a MAC address. The valid format is HHHH.HHHH.HHHH.

**ethernet-tag** *tag-id*

Specifies an Ethernet tag. Valid values range from 1 through 4294967295.

**l2-vni** *number*

Specifies a layer 2 virtual network identifier (VNI). Valid values range from 1 through 16777215.

**esi-value** *value*

Specifies a 10 byte Ethernet Segment Identifier (ESI) value in the form of hexadecimal characters (HH.HH.HH.HH.HH.HH.HH.HH.HH.HH).

**ipv4-address** *address*

Specifies an IPv4 address.

**ipv6-address** *address*

Specifies an IPv6 address.

*ip address/mask*

Specifies an IPv4 address and mask.

*ipv6 address/mask*

Specifies an IPv6 address and mask.

**tag** *tag-id*

Specifies an Ethernet tag. Valid values range from 1 through 4294967295.

**l3vni** *value*

Specifies a Layer 3 virtual network identifier (VNIs). Valid values range from 1 through 6777215.

## Modes

Privileged EXEC mode

## Examples

The following example shows detailed MAC information for a BGP EVPN route with the RD 6.0.0.6:32790.

```
device# show bgp evpn routes rd 6.0.0.6:32790 type mac detail

Status A:AGGREGATE B:BEST b:NOT-INSTALLED-BEST C:CONFED_EBGP D:DAMPED
E:EBGP H:HISTORY I:IBGP L:LOCAL M:MULTIPATH m:NOT-INSTALLED-MULTIPATH
S:SUPPRESSED F:FILTERED s:STALE
1 Prefix: MAC:[0][0000.abba.abba], Status: BE, Age: 1d7h26m34s
  NEXT_HOP: 57.0.0.57, Learned from Peer: 2.0.0.2 (65002)
  LOCAL_PREF: 100, MED: none, ORIGIN: incomplete, Weight: 0
  AS_PATH: 65002 65006
    Extended Community: ExtCom:06:00:01:00:00:00:00:00 ExtCom:03:0d:00:00:00:00:00:00 ExtCom:
03:0c:00:00:00:00:00:08 RT 65006:22
    Mac Mobility Sticky: True
    Default Extd Gw Community: Received
    Extended Community: ExtCom: Tunnel Encapsulation (Type Vxlan)
    Adj_RIB_out count: 2, Admin distance 20
    L2_vni: 22
    ESI : 00.00000000000000000000
2 Prefix: MAC:[0][0000.abba.abba], Status: E, Age: 1d7h26m34s
  NEXT_HOP: 57.0.0.57, Learned from Peer: 3.0.0.3 (65002)
  LOCAL_PREF: 100, MED: none, ORIGIN: incomplete, Weight: 0
  AS_PATH: 65002 65006
    Extended Community: ExtCom:06:00:01:00:00:00:00:00 ExtCom:03:0d:00:00:00:00:00:00 ExtCom:
03:0c:00:00:00:00:00:08 RT 65006:22
    Mac Mobility Sticky: True
    Default Extd Gw Community: Received
    Extended Community: ExtCom: Tunnel Encapsulation (Type Vxlan)
    L2_vni: 22
    ESI : 00.00000000000000000000
3 Prefix: MAC:[0][0000.abba.baba], Status: BE, Age: 1d7h26m34s
  NEXT_HOP: 57.0.0.57, Learned from Peer: 2.0.0.2 (65002)
  LOCAL_PREF: 100, MED: none, ORIGIN: incomplete, Weight: 0
  AS_PATH: 65002 65006
    Extended Community: ExtCom:06:00:01:00:00:00:00:00 ExtCom:03:0d:00:00:00:00:00:00 ExtCom:
03:0c:00:00:00:00:00:08 RT 65006:22
    Mac Mobility Sticky: True
    Default Extd Gw Community: Received
    Extended Community: ExtCom: Tunnel Encapsulation (Type Vxlan)
    Adj_RIB_out count: 2, Admin distance 20
    L2_vni: 22
    ESI : 00.00000000000000000000
4 Prefix: MAC:[0][0000.abba.baba], Status: E, Age: 1d7h26m34s
  NEXT_HOP: 57.0.0.57, Learned from Peer: 3.0.0.3 (65002)
  LOCAL_PREF: 100, MED: none, ORIGIN: incomplete, Weight: 0
  AS_PATH: 65002 65006
    Extended Community: ExtCom:06:00:01:00:00:00:00:00 ExtCom:03:0d:00:00:00:00:00:00 ExtCom:
03:0c:00:00:00:00:00:08 RT 65006:22
    Mac Mobility Sticky: True
    Default Extd Gw Community: Received
    Extended Community: ExtCom: Tunnel Encapsulation (Type Vxlan)
    L2_vni: 22
    ESI : 00.00000000000000000000
5 Prefix: MAC:[0][0027.f8ca.76ba], Status: BE, Age: 1d7h27m2s
  NEXT_HOP: 57.0.0.57, Learned from Peer: 2.0.0.2 (65002)
  LOCAL_PREF: 100, MED: none, ORIGIN: incomplete, Weight: 0
  AS_PATH: 65002 65006
    Extended Community: ExtCom:06:00:01:00:00:00:00:00 ExtCom:03:0d:00:00:00:00:00:00 ExtCom:
03:0c:00:00:00:00:00:08 RT 65006:22
    Mac Mobility Sticky: True
    Default Extd Gw Community: Received
    Extended Community: ExtCom: Tunnel Encapsulation (Type Vxlan)
    Adj_RIB_out count: 2, Admin distance 20
    L2_vni: 22
    ESI : 00.00000000000000000000
...
```

The following example shows detailed inclusive multicast information for a BGP EVPN route with the RD 6.0.0.6:32790.

```

device# show bgp evpn routes rd 6.0.0.6:32790 type inclusive-multicast detail

Status A:AGGREGATE B:BEST b:NOT-INSTALLED-BEST C:CONFED_EBGP D:DAMPED
       E:EBGP H:HISTORY I:IBGP L:LOCAL M:MULTIPATH m:NOT-INSTALLED-MULTIPATH
       S:SUPPRESSED F:FILTERED s:STALE
1     Prefix: IMR:[0][IPv4:57.0.0.57], Status: BE, Age: 1d7h34m37s
       NEXT_HOP: 57.0.0.57, Learned from Peer: 2.0.0.2 (65002)
       LOCAL_PREF: 100, MED: none, ORIGIN: incomplete, Weight: 0
       AS_PATH: 65002 65006
       Extended Community: ExtCom:03:0c:00:00:00:00:00:08 RT 65006:22
       PMSI Attribute Flags: 0x00000000 Label-Stack: 0x00000016 Tunnel-Type: 0x00000006 Tunnel-
IP: 57.0.0.57
       Extended Community: ExtCom: Tunnel Encapsulation (Type Vxlan)
       Adj_RIB_out count: 2, Admin distance 20
       L2_vni: 22
2     Prefix: IMR:[0][IPv4:57.0.0.57], Status: E, Age: 1d7h34m37s
       NEXT_HOP: 57.0.0.57, Learned from Peer: 3.0.0.3 (65002)
       LOCAL_PREF: 100, MED: none, ORIGIN: incomplete, Weight: 0
       AS_PATH: 65002 65006
       Extended Community: ExtCom:03:0c:00:00:00:00:00:08 RT 65006:22
       PMSI Attribute Flags: 0x00000000 Label-Stack: 0x00000016 Tunnel-Type: 0x00000006 Tunnel-
IP: 57.0.0.57
       Extended Community: ExtCom: Tunnel Encapsulation (Type Vxlan)
       L2_vni: 22
    
```

## History

Release version	Command history
17r.1.01	This command was introduced.



# show bgp evpn routes unreachable

Displays route information about BGP EVPN routes whose destinations are unreachable through any of the paths in the BGP EVPN route table.

## Syntax

```
show bgp evpn routes unreachable
```

## Modes

Privileged EXEC mode

## Examples

The following example shows output for the **show bgp evpn routes unreachable** command.

```
device# show bgp evpn routes unreachable

Status A:AGGREGATE B:BEST b:NOT-INSTALLED-BEST C:CONFED_EBGP D:DAMPED
E:EBGP H:HISTORY I:IBGP L:LOCAL M:MULTIPATH m:NOT-INSTALLED-MULTIPATH
S:SUPPRESSED F:FILTERED s:STALE
Prefix          Next Hop          MED          LocPrf        Weight Status
1 AD:[00.000000000000989900][4294967295]
  78.0.0.78      0              100          0             BME
  AS_PATH: 2 3
2 AD:[00.000000000000989900][4294967295]
  78.0.0.78      0              100          0             ME
  AS_PATH: 2 3
3 ESR:[00.000000.000000.989900][IPv4:8.0.0.8]
  78.0.0.78      0              100          0             BE
  AS_PATH: 2 3
4 ESR:[00.000000.000000.989900][IPv4:8.0.0.8]
  78.0.0.78      0              100          0             E
  AS_PATH: 2 3
5 IP4Prefix:[0][11.1.1.0/24]
  78.0.0.78      0              100          0             BE
  AS_PATH: 2 3
  L3_vni: 10020 Router Mac : 50:eb:1a:13:ce:f5
6 IP4Prefix:[0][11.1.1.0/24]
  78.0.0.78      0              100          0             E
  AS_PATH: 2 3
  L3_vni: 10020 Router Mac : 50:eb:1a:13:ce:f5
7 IP4Prefix:[0][12.1.1.0/24]
  78.0.0.78      0              100          0             BE
  AS_PATH: 2 3
  L3_vni: 10020 Router Mac : 50:eb:1a:13:ce:f5
8 IP4Prefix:[0][12.1.1.0/24]
  78.0.0.78      0              100          0             E
  AS_PATH: 2 3
  L3_vni: 10020 Router Mac : 50:eb:1a:13:ce:f5
```

## History

Release version	Command history
17r.1.01	This command was introduced.

# show bgp evpn summary

Displays the EVPN neighbors configured on the router, including how many routes have been received, sent, and filtered.

## Syntax

```
show bgp evpn summary
```

## Modes

Privileged EXEC mode

## Examples

The following example displays summarized information for EVPN neighbors.

```
device# show bgp evpn summary
BGP4 Summary
Router ID: 3.3.100.3   Local AS Number: 100
Confederation Identifier: not configured
Confederation Peers:
Maximum Number of IP ECMP Paths Supported for Load Sharing: 1
Number of Neighbors Configured: 3, UP: 2
Number of Routes Installed: 5, Uses 625 bytes
Number of Routes Advertising to All Neighbors: 6 (2 entries), Uses 120 bytes
Number of Attribute Entries Installed: 7, Uses 805 bytes
'+': Data in InQueue '>': Data in OutQueue '-': Clearing
'*': Update Policy 'c': Group change 'p': Group change Pending
'r': Restarting 's': Stale '^': Up before Restart '<': EOR waiting
Neighbor Address  AS#           State      Time      Rt:Accepted  Filtered  Sent      ToSend
4.4.100.4         100           ESTAB     0h 4m49s   2            0         2         0
```

## History

Release version	Command history
17r.1.01	This command was introduced.

# show bridge-domain

Displays information about Virtual Private LAN Services (VPLS) bridge domains.

## Syntax

```
show bridge-domain [id [ logical-interface [ id ] ] ]
```

```
show bridge-domain brief [ { p2mp | p2p } ]
```

```
show bridge-domain vc-peer
```

## Parameters

*id*

Specifies the bridge-domain identifier. The range is from 1 through 4096.

### logical-interface

Causes the display of the ifindex and operational information for logical interfaces configured under the bridge domain.

*id*

Specifies a logical interface instance ID.

### brief

Causes the display of summary bridge-domain information.

### p2mp

Causes the display of multipoint service information.

### p2p

Causes the display of multi-point cross-connect service information.

### vc-peer

Causes the display of summary virtual connection (VC) peer information for the bridge domain.

## Modes

Privileged EXEC mode.

## Usage Guidelines

To display information about all bridge domains, specify the **bridge-domain** option without a bridge-domain identifier.

To display information about all logical interfaces configured under a specific bridge domain, specify the **logical-interface** option without a logical-interface identifier.

## Command Output

The following table describes elements of information displayed in output from the **show bridge-domain** command:

Output field	Description
Assigned LSPs	Assigned label-switched paths.

Output field	Description
AC LIF Count	Number of attachment circuit (AC) logical interfaces in the bridge-domain.
bpdu-drop-enable	Indicates whether dropping Layer 2 (L2) bridge protocol data units (BPDUs) is enabled (TRUE) or disabled (FALSE) for the bridge domain.
Bridge-domain Type	Bridge-domain type. Type can be multipoint service (MP) or multi-point cross-connect (P2P).
Cos Enabled	Indicates whether Cost of Service (CoS) is enabled (True) or disabled (False) for a peer device in the bridge domain.
Load-balance	Indicates whether load balancing is enabled (True) or disabled (False) for a peer device in the bridge domain.
Local switching	Indicates whether local switching is enabled (TRUE) or disabled (FALSE) for the bridge domain.
Local VC lbl	Local virtual connection label (for the pseudowire that corresponds with the peer).
Local MTU	Local maximum transmission unit configuration (for the pseudowire that corresponds with the peer).
Local VC-Type	Local virtual connection mode configuration (for the pseudowire that corresponds with the peer).
Macs Dynamically learned	MAC addresses learned dynamically from traffic on the interface part of the bridge domain.
Macs statically configured	Number of MAC addresses configured statically over interfaces associated with the bridge domain.
Number of configured end-points	Number of endpoints that are configured for the bridge domain.
Number of Active end-points	Number of endpoints that are active in the bridge domain.
PW-profile	Pseudowire profile that is associated the bridge domain.
Remote VC lbl	Remote virtual connection label (for the pseudowire that corresponds with the peer).
Remote VC MTU	Remote maximum transmission unit configuration (for the pseudowire that corresponds with the peer).
Remote VC-Type	Remote virtual connection mode configuration (for the pseudowire that corresponds with the peer).
Total number of VC peers	Number of remote VPLS provider-edge (PE) devices that this node is peered with. (This is the same as the number of remote VPLS peers.)
Total VPLS peers	Number of remote VPLS provider-edge (PE) devices that this node is peered with.
Tunnel cnt	The number of MPLS tunnels that are selected by the pseudowire (corresponding to the peer).
VC id	Virtual connection identifier.
VE if-indx	Routing interface (virtual switching interface) index.
VFI LIF Count:	Number of virtual forwarding interfaces (VFI) in the bridge-domain.

## Examples

The following example shows the information displayed by the **show bridge-domain** command.

```
device# show bridge-domain

Total Number of bridge-domains: 3
Number of bridge-domains: 3

Bridge-domain 1
-----
Bridge-domain Type: mp , VC-ID: 5
Number of configured end-points: 5 , Number of Active end-points: 4
VE if-indx: 1207959555, Local switching: TRUE, bpdu-drop-enable:TRUE
PW-profile: 1, mac-limit: 128000
Number of Mac's learned:90000,      Static-mac count: 10,
VLAN: 100, Tagged ports: 2(2 up), Un-tagged ports: 0 (0 up)
Tagged ports: Eth 0/2/6, eth 0/2/8
Un-tagged ports:

Total PW peers: 2 (2 Operational)
Peer address: 12.12.12.12, State: Operational, Uptime: 2 hr 55 min
    Load-balance: True , Cos enabled:False,
    Assigned LSP;s:
    Tnnl in use: tnl2[RSVP]
    Local VC lbl: 983040, Remote VC lbl: 983040
    Local VC MTU: 1500, Remote VC MTU: 1500,
    Local VC-Type: Ethernet(0x05), Remote VC-Type: Ethernet(0x05)
Peer address: 15.15.15.15, State: Operational, Uptime: 2 hr 55 min
    Load-balance: False , Cos enabled:False,
    Assigned LSP's: lsp1, lsp2
    Tnnl in use: tnl1[MPLS]
    Local VC lbl: 983041, Remote VC lbl: 983043
    Local VC MTU: 1500, Remote VC MTU: 1500 ,
    Local VC-Type: Ethernet(0x05), Remote VC-Type: Ethernet(0x05)

Bridge-domain 2
-----
Bridge-domain Type: mp , VC-ID: 100
Number of configured end-points: 5 , Number of Active end-points: 4
VE if-indx: NA, Local switching: FALSE, bpdu-drop-enable:FALSE
PW-profile: profile_1, mac-limit: 262144
Number of Mac's learned:90000,      Static-mac count: 10,
VLAN: 100, Tagged ports: 2(1 up), Un-tagged ports: 0 (0 up)
    Tagged ports: eth 0/2/10, eth 0/1/10
    Un-tagged ports:
VLAN: 150, Tagged ports: 1(1 up), Un-tagged ports: 0 (0 up)
    Tagged ports: eth 0/1/5
    Un-tagged ports:

Bridge-domain 3
-----
Bridge-domain Type: mp , VC-ID: 200
Number of configured end-points: 5 , Number of Active end-points: 4
VE if-indx: 120793855, Local switching: FALSE, bpdu-drop-enable:FALSE
PW-profile: 2, mac-limit: 262144
Number of Mac's learned:90000,      Static-mac count: 10,
Local switching: TRUE,
VLAN: 500, Tagged ports: 2(2 up), Un-tagged ports: 2 (1 up)
Tagged ports:      eth 0/11/6, eth 0/4/3
Un-tagged ports:

Total VPLS peers: 3 (2 Operational)
Peer address: 5.5.5.5, State: Operational, Uptime: 2 hr 35 min
    Load-balance: False , Cos enabled:False,
    Assigned LSP;s:
    Tnnl in use: tnl2[RSVP]
    Local VC lbl: 983050, Remote VC lbl: 983050
    Local VC MTU: 1500,Remote VC MTU: 1500,
    Local VC-Type: Ethernet(0x05), Remote VC-Type: Ethernet(0x05)
Peer address: 20.20.20.20, State: Operational, Uptime: 0 hr 18 min
```

show bridge-domain

```
    Load-balance: False , Cos enabled:True,
Assigned LSP's:
Tnnl in use: NA,
Local VC lbl: NA, Remote VC lbl: NA
Local VC MTU: 1500,Remote VC MTU: 1500,
Local VC-Type: Ethernet(0x05), Remote VC-Type: Ethernet(0x05)
Peer address: 10.10.10.10, State: Not-Operational (Tunnel Not Available),
    Load-balance: True , Cos enabled:False,
Assigned LSP's: lsp10, lsp15
Tnnl in use: NA,
Peer Index:2
Local VC lbl: NA, Remote VC lbl: NA
Local VC MTU: 1500,Remote VC MTU: NA ,
Local VC-Type: Ethernet(0x05), Remote VC-Type: NA
```

The following example shows information about a bridge domain (501) in which the **load-balance** and **cos** options are configured for the peer device 10.9.9.9.

```
device# show bridge-domain 501

Bridge-domain 501
-----
Bridge-domain Type: MP , VC-ID: 501
Number of configured end-points: 2 , Number of Active end-points: 2
VE if-indx: 0, Local switching: TRUE, bpdu-drop-enable: TRUE
PW-profile: default, mac-limit: 0
VLAN: 501, Tagged ports: 1(1 up), Un-tagged ports: 0 (0 up)
Tagged Ports: eth1/6.501
Un-tagged Ports:
Total VPLS peers: 1 (1 Operational):

VC id: 501, Peer address: 10.9.9.9, State: Operational, uptime: 2 min
Load-balance: True , Cos Enabled: True ,
Tunnel cnt: 16
rsvp p101(cos_enable:True cos_value:1)
rsvp p102(cos_enable:True cos_value:1)
rsvp p103(cos_enable:True cos_value:1)
rsvp p104(cos_enable:True cos_value:1)
rsvp p105(cos_enable:True cos_value:1)
rsvp p106(cos_enable:True cos_value:1)
rsvp p107(cos_enable:True cos_value:1)
rsvp p108(cos_enable:True cos_value:1)
rsvp p109(cos_enable:True cos_value:1)
rsvp p110(cos_enable:True cos_value:1)
rsvp p111(cos_enable:True cos_value:1)
rsvp p112(cos_enable:True cos_value:1)
rsvp p113(cos_enable:True cos_value:1)
rsvp p114(cos_enable:True cos_value:1)
rsvp p115(cos_enable:True cos_value:1)
rsvp p116(cos_enable:True cos_value:1)
Assigned LSPs count:0 Assigned LSPs:
Local VC lbl: 989046, Remote VC lbl: 983040,
Local VC MTU: 1500, Remote VC MTU: 1500,
Local VC-Type: 5, Remote VC-Type: 5
```

The following example shows information about bridge domain 501 in which the **load-balance** option, **cos** option and three assigned label-switched paths (p1001, p1002, and p1003) are configured for the peer device 10.9.9.9.

```
device# show bridge-domain 501

Bridge-domain 501
-----
Bridge-domain Type: MP , VC-ID: 501
Number of configured end-points: 2 , Number of Active end-points: 2
VE if-indx: 0, Local switching: TRUE, bpdu-drop-enable: TRUE
PW-profile: default, mac-limit: 0
VLAN: 501, Tagged ports: 1(1 up), Un-tagged ports: 0 (0 up)
Tagged Ports: eth1/6.501
Un-tagged Ports:
Total VPLS peers: 1 (1 Operational):

VC id: 501, Peer address: 10.9.9.9, State: Operational, uptime: 19 sec
  Load-balance: True , Cos Enabled: True ,
  Tunnel cnt: 2
  rsvp p1001(cos_enable:True cos_value:1)
  rsvp p1002(cos_enable:True cos_value:1)
  Assigned LSPs count:3 Assigned LSPs:p1001 p1002 p1000
  Local VC lbl: 989047, Remote VC lbl: 983040,
  Local VC MTU: 1500, Remote VC MTU: 1500,
  Local VC-Type: 5, Remote VC-Type: 5
```

The following example shows the information displayed by the **show bridge-domain brief** command.

```
device# show bridge-domain brief

Total Number of bridge-domains configured: 3
Number of VPLS bridge-domains: 3
Macs Dynamically learned: 100, Macs statically configured: 200

Name      ID(VC-ID)  TYPE    Intf(up)  PWs(up)  macs
-----
1          3000      MP      5(3)      -         5000
2          5000      MP      2(1)      -         80
3          8000      MP      1(1)      3(2)     100000
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show capabilities

Displays whether a variety of network services are enabled ("true") or not ("false").

## Syntax

```
show capabilities
```

## Modes

Privileged EXEC mode

## Usage Guidelines

?

## Examples

The following example displays the status of all network services:

```
device# show capabilities
capabilities mqc span true
capabilities qos system-rx-queue-limit false
capabilities qos system-tx-queue-limit true
capabilities qos show-rx-queue-interface false
capabilities qos conf-rx-queue-interface false
capabilities qos cee nas false
capabilities qos cpu slot false
capabilities qos cpu queue false
capabilities l2 port_profile true
capabilities l2 overlap_vlan true
capabilities l2 rspan false
capabilities l2 mac_move true
capabilities l2 consistency_check false
capabilities l2 learning_mode true
capabilities l2 priority_tag true
capabilities l2 internal_nsm true
capabilities l2 lif_untagged_vlan_id false
capabilities l2 bridgedomain_local_switching false
capabilities l2 dot1x false
capabilities l3 ip_mtu true
capabilities ipv6 ipv6Raguard false
capabilities ssm aclTrafficType true
capabilities lag PortchannelRedundancy false
capabilities bgp next-hop-mpls false
capabilities bgp redistribute-isis false
capabilities license eula_display true
capabilities license dpod_display false
capabilities license slot_display false
capabilities ip igmp false
capabilities ip igmp-snooping igmp-snooping-version false
capabilities tm false
capabilities overlay gre false
capabilities cfm false
```



## History

Release version	Command history
16r.1.00	This command was introduced.

# show cert-util syslogca

Displays the syslog Certification Authority (CA) certificate.

## Syntax

`show cert-util syslogca`

## Modes

Privileged EXEC mode

## Examples

To display the syslog Certification Authority (CA) certificate on the device:

```
device# show cert-util ldapca
syslog CA
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show cfm

Displays the current configuration and status of CFM.

## Syntax

```
show cfm [ brief | connectivity ]
```

## Parameters

### brief

Displays the CFM brief output.

### connectivity *session-id*

Displays the CFM connectivity configuration

## Modes

Privileged EXEC mode

## Command Output

The **show cfm** command displays the following information:

Output field	Description
Domain	The Domain is the network or the part of the network for which faults in connectivity are displayed.
Level	The level is the domain level in the range <0-7>.
Maintenance Association	The maintenance association name.
MAID Format	MAID format setting
CCM interval	The time interval between two successive Continuity Check messages (CCMs) that are sent by MEPs in the specified Maintenance Domain.
VLAN ID/ Bridge-Domain ID	The VLAN or Bridge-domain identifier of the maintenance association.
Priority	The priority of the CCM messages, sent by 'MEPs, in the range <0-7>.
MEP	The maintenance end point ID
Direction	Displays the direction the MEP was sent: Up - The MEP direction away from the monitored VLAN. Down - The MEP direction is towards the monitored VLAN.
MAC	Displays the associated MAC address.
PORT	Displays the associated port.
MIP	Displays the associated MIP.

## Examples

Typical command output displaying the CFM settings for domain MD1.

```
device# show cfm
Domain: md1
Index: 1
Level: 7
Maintenance association: ma5
MA Index: 5
CCM interval: 100 ms
Bridge-Domain ID: 50
Priority: 7
MAID Format: Short
MEP  Direction  MAC                PORT      VLAN      INNER-VLAN  PORT-STATUS-TLV
====  =====  =====  =====  =====  =====  =====
1     UP           609c.9f5f.700d  Eth 1/9   50         --         N
```

Typical command output displaying the connectivity information.

```
device# show cfm connectivity
Domain: md1
Index: 1
Level: 7
Maintenance association: ma5
MA Index: 5
CCM interval: 100 ms
Bridge-Domain ID: 50
Priority: 7
MAID Format: Short
MEP Id: 1
MEP Port: Eth 1/9
RMEP  MAC                VLAN/PEER      INNER-VLAN  PORT      STATE
====  ==  =====  =====  =====  =====  =====
2     609c.9f5e.4809  19.1.1.1       --          --         OK
```

Typical command output displaying the brief output.

```
device# show cfm brief
Domain: md1
Index: 1
Level: 7  Num of MA: 1
Maintenance association: ma5
MA Index: 5
CCM interval: 100 ms
Bridge-Domain ID: 50
Priority: 7
MAID Format: Short
Num of MEP: 1  Num of RMEP: 1
rmepfail: 0  rmepok: 1
```

## History

Release version	Command history
16r.1.01	This command was introduced.

# show cfm y1731 action-profile

Displays the Y.1731 action profile.

## Syntax

```
show cfm y1731 action-profile
```

## Modes

Privileged EXEC mode

## Examples

This example displays the Y. 1731 action-profiles.

```
device# show cfm y1731 action-profile
-----
Name                : al
Event               : CCM Down
Action(s)           : Interface Down
-----
```

## History

Release version	Command history
17r.1.01	This command was introduced.

# show cfm y1731 delay-measurement

Displays detailed info for all measurement sessions.

## Syntax

`show cfm y1731 delay-measurement`

`show cfm y1731 delay-measurement brief`

`show cfm y1731 delay-measurement session session-id`

`show cfm y1731 delay-measurement statistics`

`show cfm y1731 delay-measurement statistics brief`

`show cfm y1731 delay-measurement statistics session session-id brief`

`show cfm y1731 delay-measurement statistics session session-id brief`

## Parameters

**brief**

Specifies brief.

**session** *session-id*

Specifies session and the session ID.

**statistics**

Specifies statistics.

**history***history-index*

Specifies history and the history index..

## Modes

Privileged EXEC mode

## Examples

This example displays detailed info for all measurement sessions.

```
device# show cfm y1731 delay-measurement statistics brief
-----
Session Index : 1
Test Profile Name : my_test_profile2
-----
HISTORY TABLE :
-----
Index      Start      Elapsed    Avg Delay(us)  Max Delay(us)  Min Delay(ns)  FDV Avg(ns)  FDV
Max(ns)    FDV Min(ns)
-----
4          03:13:34  00:15:00   33.281        33.542         32.851        39          79          12
3          02:58:34  00:15:00   27.162        27.690         26.745        41          85          13
2          02:43:34  00:15:00   28.260        30.452         27.540        40          83          12
1          02:28:34  00:15:00   29.120        32.164         28.242        41          84          13
-----
Session Index : 2
Test Profile Name : my_test_profile2
-----
HISTORY TABLE :
-----
Index      Start      Elapsed    Avg Delay(us)  Max Delay(us)  Min Delay(ns)  FDV Avg(ns)  FDV
Max(ns)    FDV Min(ns)
-----
4          05:12:14  00:15:00   32.180        33.543         31.589        38          79          11
3          04:48:54  00:15:00   29.060        29.950         27.654        41          83          12
2          04:30:40  00:15:00   30.105        30.154         28.764        40          82          12
1          04:15:14  00:15:00   31.234        31.665         29.143        40          81          12
-----
```

## History

Release version	Command history
17r.1.01	This command was introduced.

# show cfm y1731 synthetic-loss-measurement

Displays detailed info for all measurement sessions.

## Syntax

`show cfm y1731 synthetic-loss-measurement`

`show cfm y1731 synthetic-loss-measurement brief`

`show cfm y1731 synthetic-loss-measurement session session-id`

`show cfm y1731 synthetic-loss-measurement statistics`

`show cfm y1731 synthetic-loss-measurement statistics brief`

`show cfm y1731 synthetic-loss-measurement statistics session session-id brief`

`show cfm y1731 synthetic-loss-measurement statistics session session-id brief`

`show cfm y1731 synthetic-loss-measurement statistics session session-id history history-index`

## Parameters

**brief**

Specifies brief.

**session** *session-id*

Specifies session and the session ID.

**statistics**

Specifies statistics.

**history***history-index*

Specifies history and the history index..

## Modes

Privileged EXEC mode



## Examples

This example displays detailed info for all measurement sessions.

```

device# show cfm y1731 synthetic-loss-measurement
  SLM Session Index      : 1
Test Profile Name       : my_test_profile1
Status                  : Active
Session Type           : Initiator
Domain                  : mdl
MA                      : ma1
Source MEP              : 1
Target MEP              : 2
Cos                     : 5
Start time              : 19:49:55
Start time type         : Fixed
Stop time               : 00:00:00
Stop time type          : Fixed
Tx-interval(sec)        : 1
Measurement-interval(min) : 15
Forward Average (milliPercent) : 4294967295
Forward Max (milliPercent) : 4294967295
Backward Average (milliPercent) : 1
Backward Max (milliPercent) : 4
-----

SLM Session Index      : 2
Test Profile Name       : my_test_profile2
Status                  : Active
Session Type           : Responder
Domain                  : md2
MA                      : ma2
Source MEP              : 2
Target MEP              : 1
Cos                     : 7
Start time              : 01:30:30
Start time type         : Fixed
Stop time               : 02:30:30
Stop time type          : Fixed
Tx-interval(sec)        : 2
Measurement-interval(min) : 10
Forward Average (milliPercent) : 4294967295
Forward Max (milliPercent) : 4294967295
Backward Average (milliPercent) : 1
Backward Max (milliPercent) : 3

```

## History

Release version	Command history
17r.1.01	This command was introduced.

# show cfm y1731 test-profile

Displays the Y.1731 test profile.

## Syntax

```
show cfm y1731 synthetic-loss-measurement
```

## Modes

Privileged EXEC mode

## Examples

This example displays the Y.1731 test profile.

```
-----
Default Test Profiles:
-----
Name                : 2dm-default-profile
Type                : ETH-DM
Cos Value           : 7
Tx-Interval         : 1 Second
Tx-Frame-Count      : 10
Measurement Interval : 15 Minute(s)
Threshold Average    : 4294967295 (uSec)
Threshold Max        : 4294967295 (uSec)
Start time           : 00:05:00 (After)
Stop time            : 01:05:00 (After)
Timeout              : 1 Second
-----

Name                : 2slm-default-profile
Type                : ETH-SLM
Cos Value           : 7
Tx-Interval         : 1 Second
Tx-Frame-Count      : 10
Measurement Interval : 15 Minute(s)
Threshold Backward Average : 4294967295
Threshold Backward Max   : 4294967295
Threshold Forward Average : 4294967295
Threshold Forward Max    : 4294967295
Start time            : 00:05:00 (After)
Stop time             : 01:05:00 (After)
Timeout               : 1 Second
-----
```

## History

Release version	Command history
17r.1.01	This command was introduced.

# show chassis

Displays the status for components in the chassis.

## Syntax

```
show chassis [ virtual-ip ]
```

## Parameters

**virtual-ip**

Displays the virtual IP address and status.

## Modes

Privileged EXEC mode

## Usage Guidelines

This command is executed on the local switch and is supported only on the local switch. The output of this command depends on the platforms on which it is executed.

Pagination is not supported with this command. Use the "more" parameter to display the output one page at a time.

Supply power values are positive; consumer power values are negative.

## Examples

The following example displays chassis information on an SLX 9850.

```

device# show chassis
Chassis Model:BR-SLX9850-4
switchType: 2000

MM Slot: M1
Blade Version:          1
Power Consume Factor: -100
Power Usage (Watts): -115
Factory Part Num:      60-1003051-03
Factory Serial Num:    DCR0309L002
Manufacture:           Day: 13  Month:  4  Year: 2015
Update:                Day: 10  Month:  9  Year: 2017
Time Alive:            428 days
Time Awake:            0 days

SFM Slot: S1
Blade Version:          1
Power Consume Factor: -124
Power Usage (Watts): -111
Factory Part Num:      60-1003092-01
Factory Serial Num:    DUB0309L012
Manufacture:           Day: 23  Month:  3  Year: 2015
Update:                Day: 10  Month:  9  Year: 2017
Time Alive:            427 days
Time Awake:            0 days

LC Slot: L1
Blade Version:          1
Power Consume Factor: -362
Power Usage (Watts): -210
Factory Part Num:      40-1001025-02
Factory Serial Num:    DBZ0309L001
Manufacture:           Day:  0  Month:  0  Year: 2000
Update:                Day: 10  Month:  9  Year: 2017
Time Alive:            443 days
Time Awake:            0 days

POWER SUPPLY Unit: 1
Power Consume Factor: 0
Factory Part Num:      11447,   BLDH
Factory Serial Num:    11447,   BLD
Manufacture:           Day:  1  Month:  3  Year: 2011
Time Awake:            0 days
ID:                    11447

FAN Unit: 1
Power Consume Factor: -348
Power Usage (Watts): -34
Factory Part Num:      60-1003113-03
Factory Serial Num:    DUX0305L01E
Manufacture:           Day: 12  Month:  2  Year: 2015
Time Awake:            0 days

FAN Unit: 2
Power Consume Factor: -348
Power Usage (Watts): -34
Factory Part Num:      60-1003113-03
Factory Serial Num:    DUX0305L01G
Manufacture:           Day: 12  Month:  2  Year: 2015
Time Awake:            0 days

FAN Unit: 3
Power Consume Factor: -348
Power Usage (Watts): -32
Factory Part Num:      60-1003113-03
Factory Serial Num:    DUX0305L02H
Manufacture:           Day: 12  Month:  2  Year: 2015

```

```
Time Awake:          0 days

CID Unit: 1
Power Consume Factor: -1
Factory Part Num:    60-1003219-01
Factory Serial Num:  DZX0305L007
Manufacture:         Day: 26 Month: 1 Year: 2015
Time Awake:         0 days
```

```
CID Unit: 2
Power Consume Factor: -1
Factory Part Num:    60-1003219-01
Factory Serial Num:  DZX0305L00S
Manufacture:         Day: 26 Month: 1 Year: 2015
Time Awake:         0 days
```

```
Total Power Usage (Watts): 536
```

```
Chassis Factory Serial Num: ABC0305D123
```

The following example displays results of the **virtual-ip** option.

```
device# show chassis virtual-ip
chassis virtual-ip "static 10.25.6.166/22 oper-status up"
```

# show cipherset

Displays the current cipherset status for LDAP and SSH.

## Syntax

`show cipherset`

## Modes

Privileged EXEC mode

## Examples

To display cipherset status on the device:

```
device# show cipherset
```

```
LDAP Cipher List      : !DH:HIGH:-MD5
SSH Cipher List       : 3des-cbc, aes128-cbc, aes192-cbc, aes256-cbc
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show cli

Displays all the current CLI settings.

## Syntax

`show cli`

## Modes

Privileged EXEC mode

## Examples

Typical command output display.

```
device# show cli
autowizard                false
complete-on-space        false
history                   100
idle-timeout              600
ignore-leading-space     false
output-file               terminal
paginate                  true
prompt1                   \H\M#
prompt2                   \H(\m) #
screen-length             73
screen-width              120
service prompt config    true
show-defaults            false
terminal                  ansi
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show clock

Returns the local time, date, and time zone.

## Syntax

`show clock`

## Command Default

The local clock is used.

## Modes

Privileged EXEC mode

## Usage Guidelines

The command displays the current time for the device.

## Examples

The following example shows the clock time.

```
device# show clock
2017-02-28 17:58:30 Etc/GMT
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# show cluster

Displays the MCT cluster information including client, PW client, member bridge domain, and member VLAN information.

## Syntax

```
show cluster { cluster-ID [ { client [ client-ID ] } | client-pw ] } | member bridge-domain | member vlan
```

## Parameters

*cluster-ID*

Specifies the cluster ID to display the cluster configuration, peer, PW client, and client information.

**client**

Specifies the displaying of all clients for the cluster including their names, IDs, local and remote labels, associated interface, and local and remote states.

*client-ID*

Optionally specifies the cluster client ID to also display the associated VLANs and the deployed and undeployed count. However, local and remote label information are not provided.

**client-pw**

Specifies the displaying of the PW client information for VPLS or VLL MCT.

**member bridge-domain**

Specifies the displaying of the member bridge domain for the cluster including the local and remote multicast and unicast labels, and forwarding state.

**member vlan**

Specifies the displaying of the member VLANs for the cluster including the local and remote multicast and unicast labels.

## Modes

Privileged EXEC mode

## Usage Guidelines

When you delete an IP router ID that is used as the neighbor ID and IP address on an MCT peer, the **show cluster** command on the MCT peer devices displays inconsistent cluster states.

## Command Output

The **show cluster** command displays the following information:

Output field	Description
Cluster	Name of the cluster
	Cluster State
	Whether the cluster is deployed or undeployed
	Client Isolation Mode
	Client-isolation mode configuration: Strict or Loose.

Output field	Description	
	Configured Member Vlan Range	Configured VLANs as members to the MCT cluster.
	Active Member Vlan Range	Active member VLANs.
	Configured Member BD Range	Configured bridge domains as members to the MCT cluster.
	Active Member BD Range	Active member bridge domains.
	No. of Peers	Number of cluster peers.
	No. of Clients	Number of cluster clients.
Peer Info	Peer information	
	Peer IP	Configured IP address for the MCT cluster peer.
	Peer Interface	Configured peer interface slot and port.
	State	Whether the peer state is UP or DOWN.
PW client Info	PW client information	
	ESI	Configured Ethernet Segment ID (ESI) value.
	Deploy	Whether the PW client is deployed (TRUE or FALSE).
	State	Whether the client state is UP or DOWN.
Client Info	Cluster client information	
	Name	Configured client name.
	ID	Configured client ID.
	ESI	Configured Ethernet Segment ID (ESI) value.
	Interface	Configured interface assigned to the client.
	Local/Remote State	Local and remote state of the client; Up or Down, Deployed (Dep) or Undeployed (UnDep).

The **client-pw** option with the **show cluster** command displays the following information:

Output field	Description
Client	Client type as Client-pw.
Client ID	Internally-generated PW client ID.
Deployed or Undeployed	Whether the PW client is deployed or undeployed
State	Whether the PW client state is Up or Down.
Bridge-domains	Configured bridge domains IDs.
Elected DF for Bridge-domains	Bridge domain ID elected as the designated forwarder.

## Examples

The following example shows the information of the cluster on the SLX-OS device.

```
device# show cluster 1
Cluster c1 1
=====
Cluster State: Deployed
Client Isolation Mode: Loose
Configured Member Vlan Range: 100-101
Active Member Vlan Range: 100-101
Configured Member BD Range: 1000-1001
Active Member BD Range: 1000-1001
No. of Peers: 1
No. of Clients: 2
```

```
Peer Info:
=====
Peer IP: 10.38.38.38, State: Up
Peer Interface: Ethernet 3/1
```

```
Client Info:
=====
Name           Id           ESI           Interface           Local/Remote State
----           -
c3             3           a:b:1:2:3:0:0:0  Port-channel 100    Up / Up
Client-PW     34816      a:b:c:d:0:0:0:0  PW                  Up / Up
```

The following example shows the PW client information.

```
device#show cluster 1 client-pw
Client Info:
=====
Client: Client-pw, client-id: 34816, Deployed, State: Up
Interface: PW
Bridge-domains: 8100-8101
Elected DF for Bridge-domains:
8100
```

The following example shows the member bridge-domain information.

```
device# show cluster member bridge-domain
BD-ID      Mcast-label(Lo/Re)  Unicast-label(Lo/Re)  Forwarding state
-----
1000      822248/ -1          805864/ 0             Down
1001      822249/ -1          805865/ 0             Down
```

## History

Release version	Command history
16r.1.01	This command was introduced.
17r.1.01	Added PW client fields when displaying the cluster information, and options for the displaying of the PW client and member bridge domain information related to VPLS or VLL MCT.

# show copy-support status

Displays the status of the copy support operation.

## Syntax

`show copy-support status`

## Modes

Privileged EXEC mode

## Usage Guidelines

The status is indicated by the percentage of completion. NORMAL indicates process is proceeding or completed without errors. FAULTY indicates a faulty blade.

This command is supported only on the local device.

## Examples

To display the support upload status:

```
device# show copy-support status
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show cpu-interface

Displays information about the CPU Ethernet interface.

## Syntax

```
show cpu-interface { statistics interface backplane }
```

## Modes

Privileged EXEC mode

## Examples

To display information about the CPU Ethernet interface:

```
device# show cpu-interface statistics interface backplane  
Wave Management Interface Does Not Know The Client
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show crypto ca

Displays the crypto trust point/certificate information for HTTPS.

## Syntax

```
show crypto ca {trustpoint | certificates}
```

## Parameters

### trustpoint

Displays the trustpoint and associated key pair details.

### certificates

Displays the CA certificate and Identity certificate details.

## Modes

Privileged EXEC mode

## Usage Guidelines

To execute this command from other configuration modes, use the **do** command modifier.

## Examples

Typical command display output:

```
device# show crypto ca trustpoint
trustpoint: t1; key-pair: k1
```

Typical command display output for certificates:

```
device# show crypto ca certificates
Trustpoint: t1
certificate:
SHA1 Fingerprint=B7:5B:DB:9B:24:69:40:39:36:66:4D:59:2C:69:83:8E:93:CA:23:0C
Subject: C=US, ST=CA, L=SJ, O=BRC, OU=SF, CN=10:00:00:27:F8:87:70:29
Issuer: C=US, ST=CA, L=SJ, O=BR, OU=SF, CN=SOUND/emailAddress=sravi
Not Before: Oct 6 23:44:27 2014 GMT
Not After : Oct 6 23:44:27 2015 GMT
purposes: sslserver
CA certificate:
SHA1 Fingerprint=76:5B:D4:2C:CB:54:FE:6B:C5:E0:E3:FD:11:B0:88:70:80:12:C6:63
Subject: C=US, ST=CA, L=SJ, O=BR, OU=SF, CN=SOUND/emailAddress=sravi
Issuer: C=US, ST=CA, L=SJ, O=BR, OU=SF, CN=SOUND/emailAddress=sravi
Not Before: Sep 19 20:56:49 2014 GMT
Not After : Oct 19 20:56:49 2014 GMT
purposes: sslserver
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show crypto key

Displays the crypto key pair information for HTTPS.

## Syntax

```
show crypto key mypubkey
```

## Modes

Privileged EXEC mode

## Usage Guidelines

To execute this command from other configuration modes, use the **do** command modifier.

## Examples

Typical command output:

```
device# show crypto key mypubkey
key type: ecdsa
key label: k1
key size: 384
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# show debug arp packet

Displays the ARP-packet debug configuration.

## Syntax

```
show debug arp packet [ buffer ]
```

## Parameters

**buffer**

Displays ARP packets saved in the relevant buffer.

## Modes

Privileged EXEC mode

## Command Output

The **show debug arp packet** command displays the following information:

Output field	Description
Protocol Type	Displays "ARP".
Package Flow	Displays "Sending" or "Rcvd".
Packet Type	Displays "ARP".
VRF ID	Displays the VRF ID.
Interface Info	Displays the physical or port-channel interface.
SrcMAC	Displays the MAC address of the source.
DstMAC	Displays the MAC address of the destination.
SrcIP	Displays the IP address of the source.
DstIP	Displays the IP address of the destination.

## Examples

The following example is a typical output of the **show debug arp packet buffer** option.

```
device# show debug arp packet buffer
Protocol Type      : ARP
Packet Flow       : Sending
Packet Type       : Req
VRF ID            : 1
Interface info    : Eth 1/1
Ethernet, SrcMAC  : 768e.f807.2005, DstMAC: 0000.0000.0000
Internet proto,SrcIP : 11.1.1.1, DstIP: 11.1.1.1

Protocol Type      : ARP
Packet Flow       : Sending
Packet Type       : Req
VRF ID            : 1
Interface info    : Eth 1/1
Ethernet, SrcMAC  : 768e.f807.2005, DstMAC: 0000.0000.0000
Internet proto,SrcIP : 11.1.1.1, DstIP: 11.1.1.1

Protocol Type      : ARP
Packet Flow       : Rcvd
Packet Type       : Req
VRF ID            : 1
Interface info    : Eth 1/1
Ethernet, SrcMAC  : 0010.9400.0001, DstMAC: 0000.0000.0000
Internet proto,SrcIP : 11.1.1.2, DstIP: 11.1.1.1

Protocol Type      : ARP
Packet Flow       : Sending
Packet Type       : Rep
VRF ID            : 1
Interface info    : Eth 1/1
Ethernet, SrcMAC  : 768e.f807.2005, DstMAC: 0010.9400.0001
Internet proto, SrcIP : 11.1.1.1, DstIP: 11.1.1.2
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show debug dhcp packet

Displays the Dynamic Host Control Protocol (DHCP) packet capture configuration for interfaces configured for DHCP packet capturing.

## Syntax

```
show debug dhcp packet
```

## Modes

Privileged EXEC mode

## Examples

The following example displays the DHCP packet capture configuration on interfaces.

```
device# show debug dhcp packet
% DHCP protocol RCV debug is enabled on interface Eth 0/18
% DHCP protocol TX debug is enabled on interface Eth 0/18
PCAP Buffer Configuration for Vrf ID 0: Buffer Type is Linear and BufferSize is 2056
```

## History

Release version	Command history
16r.1.00	This command was introduced.

show debug dhcp packet buffer

# show debug dhcp packet buffer

Displays Dynamic Host Configuration Protocol (DHCP) packets saved in the DHCP packet capture buffer for all VRF IDs.

## Syntax

`show debug dhcp packet buffer`

## Modes

Privileged EXEC mode

## Examples

The following command displays buffer content for all VRF IDs.

```
device# show debug dhcp packet buffer
Protocol Type      : DHCP
Packet Flow       : RX
Src Port          : 68 (DHCP Client)
Dst Port          : 67 (DHCP Server)
Message Type      : 1 (DHCP-Discover)
Hardware Type     : 1 (Ethernet (10Mb))
Hw Address Len    : 6
Hops              : 0
Transaction ID    : 0
Seconds Elapsed   : 0
BootP Flags       : 8000
Client IP         : 0.0.0.0
Your (client) IP  : 0.0.0.0
Next Server IP    : 0.0.0.0
Relay Agent IP    : 0.0.0.0
Client MAC Add    : 00:10:94:00:00:01
Server Host Name  : Not Given
Boot File Name    : Not Given
*****
Protocol Type     : DHCP
Packet Flow       : TX
Src Port          : 67 (DHCP Server)
Dst Port          : 68 (DHCP Client)
Message Type      : 2 (DHCP-Offer)
Hardware Type     : 1 (Ethernet (10Mb))
Hw Address Len    : 6
Hops              : 1
Transaction ID    : 0
Seconds Elapsed   : 0
BootP Flags       : 8000
Client IP         : 0.0.0.0
Your (client) IP  : 10.10.10.30
Next Server IP    : 20.20.20.20
Relay Agent IP    : 10.10.10.10
Client MAC Add    : 00:10:94:00:00:01
Server Host Name  : Not Given
Boot File Name    : Not Given
*****
Protocol Type     : DHCP
Packet Flow       : RX
Src Port          : 68 (DHCP Client)
Dst Port          : 67 (DHCP Server)
Message Type      : 3 (DHCP-Request)
Hardware Type     : 1 (Ethernet (10Mb))
Hw Address Len    : 6
Hops              : 0
Transaction ID    : 0
Seconds Elapsed   : 0
BootP Flags       : 8000
Client IP         : 0.0.0.0
Your (client) IP  : 0.0.0.0
Next Server IP    : 0.0.0.0
Relay Agent IP    : 0.0.0.0
Client MAC Add    : 00:10:94:00:00:01
Server Host Name  : Not Given
Boot File Name    : Not Given
*****
Protocol Type     : DHCP
Packet Flow       : TX
Src Port          : 67 (DHCP Server)
Dst Port          : 68 (DHCP Client)
Message Type      : 5 (DHCP-Ack)
Hardware Type     : 1 (Ethernet (10Mb))
Hw Address Len    : 6
Hops              : 1
Transaction ID    : 0
```

show debug dhcp packet buffer

```
Seconds Elapsed      : 0
BootP Flags          : 8000
Client IP            : 0.0.0.0
Your (client) IP    : 10.10.10.30
Next Server IP      : 20.20.20.20
Relay Agent IP      : 10.10.10.10
Client MAC Add       : 00:10:94:00:00:01
Server Host Name     : Not Given
Boot File Name       : Not Given
*****
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show debug ip bgp all

Displays all BGP4 debugging options that are enabled.

## Syntax

```
show debug ip bgp all
```

## Modes

Privileged EXEC mode

## Examples

The following example displays all BGP4 debugging options that are enabled.

```
device# show debug ip bgp all
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show debug ip igmp

Displays the Internet Group Management Protocol (IGMP) packets received and transmitted, as well as related events.

## Syntax

`show debug ip igmp`

## Modes

Privileged EXEC mode

## Examples

The following displays example output.

```
device# show debug ip igmp
IGMP debugging status:
```

```
-----
errors          : off
group           : off
packets         : off
query           : off
report          : off
direction       : none
vlan            : none
l2_port         : none
```

## History

Release version	Command history
16r.1.00	This command was modified to include the output example.



# show debug ipv6 mld

Displays the IPv6 Multicast Listener Discovery (MLD) packets received and transmitted, as well as related events.

## Syntax

```
show debug ipv6 mld
```

## Modes

Privileged EXEC mode

## Examples

The following example displays the output of the **show debug ipv6 mld** command.

```
device# show debug ipv6 mld

MLD debugging status:
-----
errors           : on
group            : off
packets          : on
query            : on
report           : on
direction        : none
vlan             : none
l2_port          : none
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show debug ipv6 packet

Displays IPv6 packets captured through the packet capture utility on an interface or all interfaces, as well as the packet capture configuration on the device.

## Syntax

```
show debug ipv6 packet [ buffer [ all | interface [ ethernet slot/port | ve vlan_id ] ] [ rx | tx ]
```

## Parameters

### buffer

Specifies IPv6 packets.

### all

Specifies all interfaces.

### interface

Specifies an interface.

### ethernet

Specifies an Ethernet port.

#### *slot*

Specifies a valid slot number. This must be **0** for devices that do not support line cards.

#### *port*

Specifies a valid port number.

### ve *vlan\_id*

Specifies a virtual Ethernet interface.

## Command Default

None

## Modes

Privileged EXEC mode

## Examples

The following example displays the current PCAP configuration on the device.

```
device# show debug ipv6 packet
```

The following example displays IPv6 packets captured on all interfaces.

```
device# show debug ipv6 packet buffer all
```

The following example displays IPv6 packets captured on a specific Ethernet interface.

```
device# show debug ipv6 packet buffer interface ethernet 0/1
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show debug lacp

Displays the status of Link Aggregation Control Protocol (LACP) debugging on the device.

## Syntax

`show debug lacp`

## Modes

Privileged EXEC mode

## History

Release version	Command history
16r.1.00	This command was introduced.

# show debug lldp

Displays the status of Link Layer Discovery Protocol (LLDP) debugging on the device.

## Syntax

```
show debug lldp
```

## Modes

Privileged EXEC mode

## Examples

The following example displays the status of LLDP debugging on the device.

```
device# show debug lldp
LLDP debugging status:
Interface Eth0/0      : Transmit Receive  Detail
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show debug spanning-tree

Displays the status of STP debugging flags on the device.

## Syntax

```
show debug spanning-tree
```

## Modes

Privileged EXEC mode

## History

Release version	Command history
16r.1.00	This command was introduced.

# show debug vrrp

Displays the status of Virtual Router Redundancy Protocol (VRRP) debugging on the device.

## Syntax

```
show debug vrrp
```

## Modes

Privileged EXEC mode

## Usage Guidelines

This command is for VRRP and VRRP-E. You can modify or redirect the displayed information by using the default Linux tokens ([, >).

## Examples

If you run this command and the debug parameter has already been set to debug all VRRP events, the following is displayed:

```
device# show debug vrrp
VRRP event debugging is on
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show defaults threshold

Displays the default thresholds for environmental and alert values for small form-factor pluggable (SFP) types.

## Syntax

```
show defaults threshold sfp type sfp-type
```

## Parameters

*sfp-type*

The following SFP types are supported:

**1GCOP**

– 1G SFP Copper

**1GCWDM**

– 1G SFP CWDM

**1GLR**

– 1G SFP LR

**1GSR**

– 1G SFP SR

**10GDWDMT**

– 10G SFP+ DWDM Tunable

**10GER**

– 10G SFP+ ER

**10GLR**

– 10G SFP+ LR

**10GSR**

– 10G SFP+ SR

**10GUSR**

– 10G SFP+ USR

**10GZR**

– 10G SFP+ ZR

**40GER**

– 40G QSFP+ ER4

**40GESR**

– 40G QSFP+ eSR4 INT

**40GLM**

– 40G QSFP+ LM4

**40GLR**

– 40G QSFP+ LR4

**40GSR**

– 40G QSFP+ SR4



- 40GSRINT**
  - 40G QSFP+ SR4 INT
- 100GAOC**
  - 100G QSFP28 AOC
- 100GCLR**
  - 100G QSFP28 CLR4
- 100GCWDM**
  - 100G QSFP28 CWDM4
- 100GESR**
  - 100G QSFP28 eSR4
- 100GLR**
  - 100G QSFP28 LR4
- 100GLRLT**
  - 100G QSFP28 LR4 Lite
- 100GPSM**
  - 100G QSFP28 PSM4
- 100GSR**
  - 100G QSFP28 SR4

## Modes

Privileged EXEC mode

## Usage Guidelines

You can modify these thresholds with the **threshold-monitor sfp** command.

## Examples

The following example displays the default sfp thresholds for 1G SFP Copper.

```
device# show defaults threshold sfp type 1GCOP
Type: 1GCOP
+-----+-----+-----+-----+-----+-----+
|          | High Threshold | Low Threshold | Buffer | | | |
| Area     | Value | Above | Below | Value  | Below  | Value  |
|          |        | Action | Action|        | Action |       |
+-----+-----+-----+-----+-----+-----+
| Temp C   | 90    | raslog | none  | -45   | raslog | 0     |
+-----+-----+-----+-----+-----+-----+
| RXP uWatts | 501  | raslog | none  | 6     | raslog | 0     |
+-----+-----+-----+-----+-----+-----+
| TXP uWatts | 794  | raslog | none  | 71    | raslog | 0     |
+-----+-----+-----+-----+-----+-----+
| Current mA | 45   | raslog | none  | 1     | raslog | 0     |
+-----+-----+-----+-----+-----+-----+
| Voltage mV | 3700 | raslog | none  | 2900  | raslog | 0     |
+-----+-----+-----+-----+-----+-----+
```

show defaults threshold

## History

Release version	Command history
16r.1.00	This command was introduced.

# show dot1x

Displays 802.1X-related information.

## Syntax

```
show dot1x [ all ]
```

```
show dot1x [ interface ethernet slot/port]
```

```
show dot1x [ diagnostics | session-info | statistics ] { interface ethernet slot/port }
```

## Parameters

### all

Displays detailed dot1x information for all of the ports.

### interface

Displays the state of a specified interface.

### diagnostics

Displays diagnostics information for the authenticator associated with a port.

### session-info

Displays all statistical information of an established session.

### statistics

Displays the statistics of a specified interface.

## Modes

Privileged EXEC mode

## Examples

The following example shows the overall state of 802.1X authentication on the system.

```
device# show dot1x
802.1X Port-Based Authentication: Enabled
PAE Capability:                    Authenticator Only
Protocol Version:                  2
Auth Server:                       RADIUS
Readiness test timeout:            10
RADIUS Configuration
-----
Position:                          1
Server Address:                    10.24.65.6
Port:                              1812
Secret:                            xxxxxxxxxx
Retry Interval:                    5 seconds
```

```
show dot1x
```

The following example shows detailed 802.1X authentication information for all of the ports.

```
device# show dot1x all
802.1X Port-Based Authentication: Enabled
PAE Capability:                      Authenticator Only
Protocol Version:                     2
Auth Server:                          RADIUS
Readiness test timeout:               10

RADIUS Configuration
-----
Position:                             1
Server Address:                       10.20.106.144
Port:                                  1812
Secret:                                testing123
Retry Interval:                       4 seconds

Position:                             2
Server Address:                       10.20.106.189
Port:                                  1812
Secret:                                testing123
Retry Interval:                       4 seconds

802.1X info for interface Eth 1/31
-----
Port Control:                         Auto
Protocol Version:                     2
ReAuthentication:                     Enabled
Auth Fail Max Attempts:               0
ReAuth Max:                           2
Tx Period:                            30 seconds
Quiet Period:                         60 seconds
Supplicant Timeout:                  30 seconds
Re-Auth Interval:                     3600 seconds
Dynamic VLAN assigned:                50
Filter-strict-security:               Enabled
IP ACL assigned (IN|OUT):             IPEXT-50 | IPEXT-OUT-50
MAC ACL assigned:                     mac-ext
```

The following example shows all diagnostics information for the authenticator associated with a port.

```
device# show dot1x diagnostics interface ethernet 1/2
802.1X Diagnostics for interface Eth 1/2
-----
authEnterConnecting:                  1
authEaplogoffWhileConnecting:         0
authEnterAuthenticating:              1
authSuccessWhileAuthenticating:       1
authTimeoutWhileAuthenticating:       0
authFailWhileAuthenticating:          0
authEapstartWhileAuthenticating:      0
authEaplogoffWhileAuthenticating:     0
authReauthsWhileAuthenticated:        0
authEapstartWhileAuthenticated:       0
authEaplogoffWhileAuthenticated:      0
BackendResponses:                     11
BackendAccessChallenges:              10
BackendOtherrequestToSupplicant:      11
BackendAuthSuccess:                   1
BackendAuthFails:                     0
```

The following example shows state of a specified interface.

```
device# show dot1x interface ethernet 1/31
802.1X info for interface Eth 1/31
-----
Port Control:           Auto
Protocol Version:      2
ReAuthentication:      Enabled
Auth Fail Max Attempts: 0
ReAuth Max:            2
Tx Period:             30 seconds
Quiet Period:          60 seconds
Supplicant Timeout:    30 seconds
Re-Auth Interval:      3600 seconds
Dynamic VLAN assigned: 50
Filter-strict-security: Enabled
IP ACL assigned (IN|OUT): IPEXT-50 | IPEXT-OUT-50
MAC ACL assigned:      mac-ext
```

The following example shows information for all clients on the port.

```
device# show dot1x session-info interface ethernet 1/2
802.1X Session info for interface Eth 1/2
-----
Mac Address: 0021.5ec6.15ce
-----
User Name:             md5user2
Session Time:          2 secs
Terminate Cause:       Not terminated yet
Session Status:        Authorized
PAE State:             Authenticated
BE State:              Idle
VLAN:                  N/A
IP ACL (IN | OUT):     N/A | N/A
MAC ACL:               N/A
Current Id:            18
Id From Server:        17
```

The following example shows the statistics of a specified interface.

```
device# show dot1x statistics interface ethernet 1/2
802.1X statistics for interface Eth 1/2
-----
EAPOL Frames Rx:      12
EAPOL Frames Tx:      43
EAPOL Start Frames Rx: 1
EAPOL Logoff Frames Rx: 0
EAP Rsp/Id Frames Rx: 1
EAP Response Frames Rx: 10
EAP Req/Id Frames Tx: 23
EAP Request Frames Tx: 10
Invalid EAPOL Frames Rx: 0
EAPOL Length Error Frames Rx: 0
EAPOL Last Frame Version Rx: 1
Invalid EAP Frames Rx: 0
EAP Length Error Frames Rx: 0
EAPOL Last Frame Src: 0021.5ec6.15ce
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show dpod

Displays Dynamic Ports on Demand (DPOD) licensing.

## Syntax

```
show dpod
```

## Modes

Privileged Exec mode

## Usage Guidelines

The **show dpod** command displays a summary of POD license status and POD license assignments.

## Examples

```
device# show dpod
48 10G ports are available in this switch
6 100G ports are available in this switch
COD license is installed
100G Port Upgrade license is installed
Dynamic POD method is in use

48 10G port assignments are provisioned for use in this switch:
24 10G port assignments are provisioned by the base switch allowance
24 10G port assignments are provisioned by the COD license
2 10G ports are assigned to the base switch allowance or installed licenses:
2 10G ports are assigned to the base switch allowance
0 10G ports are assigned to the COD license
10G ports assigned to the base switch allowance:
0/7, 0/9
10G ports assigned to the COD license:
None
10G ports that are not assigned:
0/1, 0/2, 0/3, 0/4, 0/5, 0/6, 0/8, 0/10, 0/11, 0/12
0/13, 0/14, 0/15, 0/16, 0/17, 0/18, 0/19, 0/20, 0/21, 0/22
0/23, 0/24, 0/25, 0/26, 0/27, 0/28, 0/29, 0/30, 0/31, 0/32
0/33, 0/34, 0/35, 0/36, 0/37, 0/38, 0/39, 0/40, 0/41, 0/42
0/43, 0/44, 0/45, 0/46, 0/47, 0/48
46 10G license reservations are still available for use by unassigned ports

6 100G port assignments are provisioned for use in this switch:
0 100G port assignments are provisioned by the base switch allowance
6 100G port assignments are provisioned by the 100G Port Upgrade license
3 100G ports are assigned to the base switch allowance or installed licenses:
0 100G ports are assigned to the base switch allowance
3 100G ports are assigned to the 100G Port Upgrade license
100G ports assigned to the base switch allowance:
None
100G ports assigned to the 100G Port Upgrade license:
0/49, 0/50, 0/53
100G ports that are not assigned:
0/51, 0/52, 0/54
3 100G license reservations are still available for use by unassigned ports
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# show environment fan

Displays fan status information.

## Syntax

**show environment fan**

## Modes

Privileged EXEC mode

## Command Output

The **show environment fan** command displays the following information:

Output field	Description
OK	Fan is functioning correctly at the displayed speed (RPM).
absent	Fan is not present.
below minimum	Fan is present but rotating too slowly or stopped.
above maximum	Fan is rotating too quickly.
unknown	Unknown fan unit installed.
faulty	Fan has exceeded hardware tolerance and has stopped. In this case, the last known fan speed is displayed.
Airflow direction	Port side intake or Port side exhaust. This value is not applicable to modular chassis.
speed	Fan RPM.

## Examples

The following example displays fan status information:

```
device# show environment fan

Fan 1 is Ok, speed is 4243 RPM
Fan 2 is Ok, speed is 4249 RPM

Fan 3 is Ok, speed is 4402 RPM
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# show environment history

Displays the field-replaceable unit (FRU) history log.

## Syntax

```
show environment history
```

## Modes

Privileged EXEC mode

## Usage Guidelines

The history log records insertion and removal events for field-replaceable units (FRUs), such as blades, power supplies, fans, and world wide name (WWN) or chassis ID (CID) cards. The type of FRU supported depends on the hardware platform.

## Command Output

The **show environment history** command displays the following information:

Output field	Description
Object type	On standalone platforms: FAN, POWER SUPPLY, WWN (WWN card), or UNKNOWN. On modular platforms: CHASSIS, CID (chassis ID card), FAN, POWER SUPPLY, SW BLADE (port blade), MM (management module), SFM (switch fabric module), LC (line card) or UNKNOWN.
Object number	Displays the slot number for blades. Displays the unit number for all other object types.
Event type	Displays Inserted, Removed, or Invalid.
Time of the event	Displays the date in the following format: Day Month dd hh:mm:ss yyyy.
Factory Part Number	Displays the part number (xx-yyyyyy-zz) or Not available.
Factory Serial Number	Displays the FRU serial number (xxxxxxxxxxx) or Not available.

## Examples

The following example displays the FRU history on a device.

```
device# show environment history
POWER SUPPLY Unit 1  Inserted at Sun Jul 12 21:59:17 2015
Factory Part Number:
Factory Serial Number:

POWER SUPPLY Unit 2  Inserted at Sun Jul 12 21:59:17 2015
Factory Part Number:
Factory Serial Number:

FAN Unit 1  Inserted at Sun Jul 12 21:59:17 2015
Factory Part Number: 60-1003113-03
Factory Serial Number: DUX0343K00A

FAN Unit 2  Inserted at Sun Jul 12 22:02:40 2015
Factory Part Number: 60-1003113-03
Factory Serial Number: DUX0343K00B

FAN Unit 3  Inserted at Sun Jul 12 22:02:41 2015
Factory Part Number: 60-1003113-03
Factory Serial Number: DUX0343K00C

SFM Slot S1 Inserted at Sun Jul 12 22:02:41 2015
Factory Part Number: 40-0000155-xx
Factory Serial Number: LU000000000

LC Slot L4 Inserted at Sun Jul 12 22:02:41 2015
Factory Part Number: 50-1002179-14
Factory Serial Number: BVT0307H00F

CID Unit 1  Inserted at Sun Jul 12 22:02:43 2015
Factory Part Number: 60-1003219-01
Factory Serial Number: BWF0415K00D

MM Slot M1 Inserted at Sun Jul 12 22:02:43 2015
Factory Part Number: 60-1003051-02
Factory Serial Number: DCR0341K006

(Output truncated)
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show environment power

Displays the type and current status of the switch power supply.

## Syntax

```
show environment power
```

## Modes

Privileged EXEC mode

## Command Output

The **show environment power** command displays the following information:

Output field	Description
OK	Power supply is functioning correctly.
absent	Power supply is not present.
unknown	Unknown power supply unit is installed.
predicting failure	Power supply is present but predicting failure. Replace the power supply as soon as possible.
faulty	Power supply is present but faulty (no power cable, power switch turned off, fuse blown, or other internal error).
Airflow	Direction of fan air flow (not applicable to modular chassis).

## Examples

The following example displays the power supply status.

```
device# show environment power
```

```
Power Supply #1 is OK
DELTA type: A V23.45
Power Supply #2 is OK
DELTA type: A V23.45
Power Supply #3 is absent
Power Supply #4 is absent
Power Supply #5 is absent
Power Supply #6 is absent
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show environment sensor

Displays the environment sensor status.

## Syntax

```
show environment sensor
```

## Modes

Privileged EXEC mode

## Usage Guidelines

The command output displays the current temperature, fan, and power supply status readings from sensors located on the switch. For an explanation of power supply status values, refer to the **show environment power** topic.

## Examples

The following example displays sensor readings on the device:

```
device# show environment sensor
sensor 1: (Temperature) is Ok, value is 31 C
sensor 2: (Temperature) is Ok, value is 53 C
sensor 3: (Temperature) is Ok, value is 52 C
sensor 4: (Temperature) is Ok, value is 37 C
sensor 5: (Temperature) is Ok, value is 32 C

(Output truncated)

sensor 50: (Fan          ) is Ok, speed is 4297 RPM
sensor 51: (Fan          ) is Ok, speed is 4240 RPM
sensor 52: (Fan          ) is Ok, speed is 4350 RPM
sensor 53: (Power Supply) is Ok
sensor 54: (Power Supply) is Ok
sensor 55: (Power Supply) is Absent
sensor 56: (Power Supply) is Absent
sensor 57: (Power Supply) is Absent
sensor 58: (Power Supply) is Absent
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show environment temp detail

Displays information pertaining to the environment temperature.

## Syntax

`show environment temp detail detail`

## Parameters

*detail*

Specifies to display information in detail.

## Modes

Privileged EXEC mode

## Examples

This example displays the environment temperature in detail.

```

device# show environment temp detail
Sensor ID      Slot      State      Blade Name      Sensor name      Centigrade      Fahrenheit
=====
 1             1         Ok         MM v1           1 - front        25              77
 2             1         Ok         MM v1           2 - mid-board    29              84
 3             1         Ok         MM v1           3 - backplane connector 36              96
 4             1         Ok         MM v1           4 - PEX die      19              66
=====
 5             2         Ok         MM v2           1 - front        25              77
 6             2         Ok         MM v2           2 - mid-board    28              82
 7             2         Ok         MM v2           3 - backplane connector 38              100
 8             2         Ok         MM v2           4 - PEX die      19              66
=====
 9             7         Absent
=====
10             8         Ok         SFM4 v4         TEMPO            61              141
11             8         Ok         SFM4 v4         R-FRONT          34              93
12             8         Ok         SFM4 v4         L-REAR           61              141
13             8         Ok         SFM4 v4         R-REAR           35              95
14             8         Ok         SFM4 v4         FE0              86              186
=====
15             9         Absent
=====
16            10         Absent
=====
17            11         Absent
=====
18            12         Absent
=====
19             3         Absent
=====
20             4         Absent
=====
21             5         Ok         LC72X10G v1     MB-L-REAR        30              86
22             5         Ok         LC72X10G v1     MB-R-REAR        25              77
23             5         Ok         LC72X10G v1     MB-L-FRONT        24              75
24             5         Ok         LC72X10G v1     MB-R-FRONT        30              86
25             5         Ok         LC72X10G v1     MB-JERI-1         43              109
26             5         Ok         LC72X10G v1     MB-JERI-2         30              86
27             5         Ok         LC72X10G v1     DC-Center         22              71
=====
28             6         Ok         LC36x100G v1    MB L-REAR        31              87
29             6         Ok         LC36x100G v1    MB R-REAR        24              75
30             6         Ok         LC36x100G v1    MB L-FRONT        31              87
31             6         Ok         LC36x100G v1    MB R-FRONT        26              78
32             6         Ok         LC36x100G v1    MB JERICHO 1     42              107
33             6         Ok         LC36x100G v1    MB JERICHO 2     30              86
34             6         Ok         LC36x100G v1    MB JERICHO 3     30              86
35             6         Ok         LC36x100G v1    DC L-REAR        24              75
36             6         Ok         LC36x100G v1    DC R-REAR        30              86
37             6         Ok         LC36x100G v1    DC L-FRONT        31              87
38             6         Ok         LC36x100G v1    DC R-FRONT        31              87
39             6         Ok         LC36x100G v1    DC JERICHO 1     30              86
40             6         Ok         LC36x100G v1    DC JERICHO 1     41              105
41             6         Ok         LC36x100G v1    DC JERICHO 1     30              86

```

## History

Release version	Command history
17r.1.01	This command was introduced.

# show event-handler activations

Displays operational data of activated event-handlers.

## Syntax

**show event-handler activations**

## Modes

Privileged EXEC mode

## Command Output

The **show event-handler activations** command displays the following information:

Output field	Description
Event-handler	Displays the event-handler name.
Last Trigger Activation Time	Displays the time of the last trigger activation. If no trigger was activated, displays "Never".
Total Trigger Activations	Displays the total number of trigger activations.
Last Action Completion Time	Displays the completion time of the last event-handler action run. If no event-handler action ran, displays "Never".
Last Action Completion Status. Exit Code =	Displays the status of the last completed event-handler action. If the Python script assigns exit codes, such codes are displayed here. An exit code of 0 indicates one of the following: <ul style="list-style-type: none"> <li>No code was assigned to this condition.</li> <li>The script author assigned 0 to a specified condition.</li> </ul>
Total Action Completions	Displays the number of completed event-handler actions.

## Examples

The following example displays event-handler operational data.

```
device# show event-handler activations

Event-handler : evh1
Last Trigger Activation Time: 2015-04-30 17:28:12
Total Trigger Activations: 25
Last Action Completion Time: 2015-04-30 17:28:57
Last Action Completion Status: Exit Code = 0
Total Action Completions: 25

Event-handler : evh2
Last Trigger Activation Time: 2015-04-28 22:02:51
Total Trigger Activations: 8
Last Action Completion Time: 2015-04-28 22:02:58
Last Action Completion Status: Exit Code = 0
Total Action Completions: 8
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# show file

Displays the contents of a file in the local flash memory.

## Syntax

```
show file filename
```

## Parameters

*filename*

The name of the file to be displayed.

## Modes

Privileged EXEC mode

## Usage Guidelines

This command is supported only on the local device.

## Examples

The following example displays the contents of a file in the flash memory.

```
device# show file defaultconfig.cluster
vlan dot1q tag native
!
cee-map default
remap fabric-priority priority 0
remap lossless-priority priority 0
priority-group-table 15.0 pfc off
priority-group-table 1 weight 40 pfc on
priority-group-table 2 weight 60 pfc off
priority-table 2 2 2 1 2 2 2 15.0
!!
port-profile default
vlan-profile
  switchport
  switchport mode trunk
  switchport trunk allowed vlan all
!
interface Port-channel 1
vlag ignore-split
  description Homerun port-channel on MM1
  shutdown
!
interface Port-channel 2
  vlag ignore-split
  description Homerun port-channel on MM2
  shutdown
!
protocol lldp
!!
logging auditlog class CONFIGURATION
logging auditlog class FIRMWARE
logging auditlog class SECURITY
!
end
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show firmwaredownloadhistory

Displays the firmware download history for the device.

## Syntax

```
show firmwaredownloadhistory
```

## Modes

Privileged EXEC mode

## Usage Guidelines

The log records the date and time of the firmware download, the device name, slot number, process ID, and firmware version.

Use this command to display information for the local management module only.

## Examples

The following example displays the firmware download history.

```
SLX# show firmwaredownloadhistory
```

```
Firmware version history
```

Sno	Date & Time	Switch Name	Slot	PID	OS Version
1	Thu Mar 2 05:52:27 2017	SLX	0	33552	17r.1.00
2	Wed Feb 22 17:10:45 2017	SLX	0	3187	16r.1.00

## History

Release version	Command history
16r.1.00	This command was introduced.

# show firmwaredownloadstatus

Displays the firmware download activity log.

## Syntax

```
show firmwaredownloadstatus [ brief ] [ summary ]
```

## Parameters

### brief

Displays only the last entry of the firmware download event log.

### summary

Displays a high-level summary of the firmware download status.

## Modes

Privileged EXEC mode

## Usage Guidelines

Use this command to display an event log that records the progress and status of events that occur during a firmware download. The event log is created by the **firmware download** command and is retained until you issue another **firmware download** command. A time stamp is associated with each event.

The output of **show firmwaredownloadstatus** and **show firmwaredownloadstatus brief** are equivalent.

The output varies depending on the hardware platform.

## Examples

The following example displays the firmware download event log.

```
device# show firmwaredownloadstatus
[1]: Wed Mar 1 21:58:34 2017
Slot M1: Firmware install begins.

[2]: Wed Mar 1 22:03:59 2017
Slot M1: Firmware install ends.

[3]: Wed Mar 1 22:03:59 2017
Slot M1: Firmware starts to swap.

[4]: Wed Mar 1 22:04:19 2017
Slot M1: Firmware is swapped.

[5]: Wed Mar 1 22:04:20 2017
Slot M1: The blade begins to reboot.

[6]: Wed Mar 1 22:09:03 2017
Slot L2/0: Firmware install begins.

[7]: Wed Mar 1 22:09:08 2017
Slot L4/0: Firmware install begins.

[8]: Wed Mar 1 22:11:37 2017
Slot L2/0: Firmware install ends.

[9]: Wed Mar 1 22:11:37 2017
Slot L2/0: Firmware starts to swap.

[10]: Wed Mar 1 22:11:46 2017
Slot L4/0: Firmware install ends.
```

(Output truncated)

The following example displays a high-level summary of the firmware download status.

```
device# show firmwaredownloadstatus summary
No Firmware Download session in progress.
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ha

Displays the High Availability (HA) status of the management modules.

## Syntax

```
show ha
```

## Modes

Privileged EXEC mode

## Usage Guidelines

When a failover occurs while the management modules are not synchronized, the standby management module reboots, and the failover is disruptive.

## Examples

To display HA status:

```
device# show ha
```

## History

Release version	Command history
16r.1.01	This command was introduced.

# show hardware profile

Displays details of the current active hardware profile. You can also display details for a specified TCAM profile, counter profile, or LAG profile.

## Syntax

```
show hardware profile
```

```
show hardware profile counters { counter-profile-1 | counter-profile-2 | counter-profile-3 | counter-profile-4 | default }
```

```
show hardware profile current [ usage [ slot slot-id [ chip chip-id ] ] ]
```

```
show hardware profile lag { default | lag-profile-1 }
```

```
show hardware profile tcam { default | layer2-optimised-1 | npb-optimised-1 | openflow-optimised-1 | openflow-optimised-2 | openflow-optimised-3 | vxlan-ext }
```

## Parameters

### counters

Specifies hardware resources for counter profiles.

#### counter-profile-1

Specifies resources optimized for the bridge domain, with forward and drop counting for Layer 4 ingress traffic.

#### counter-profile-2

Specifies resources optimized for the bridge domain, with hit counting for Layer 4 ingress traffic.

#### counter-profile-3

Specifies resources optimized for Layer 2, with hit counting for for Layer 4 ingress traffic.

#### counter-profile-4

Specifies resources optimized for Layer 4 and network packet broker (NPB) traffic, with forward and drop counting for all Layer 4 ingress traffic.

#### default

Specifies resources optimized for Layer 4 ingress and egress traffic.

### current

Displays current active running profile information.

#### usage

Displays usage information for the current active profile.

#### slot *slot-id*

( SLX 9850 series only ) Specifies a slot.

#### chip *chip-id*

( SLX 9850 series only ) Specifies a chip.

### lag

Specifies hardware resources for link aggregation (LAG) profiles.

#### default

Specifies the default profile, which supports up to 256 LAGs.

**lag-profile-1**

Specifies a LAG profile that supports up to 512 LAGs.

**tcam**

Specifies hardware resources for TCAM profiles.

**default**

Specifies a profile with basic support for all applications.

**layer2-optimised-1**

Specifies a profile optimized for Layer 2 ACL applications and for VPLS end points.

**npb-optimised-1**

Specifies a profile optimized for network packet broker (NPB) application.

**openflow-optimised-1**

Specifies a profile optimized for Layers 2 and 3 openflow and for IPv4.

**openflow-optimised-2**

Specifies a profile optimized for Layers 2 and 3 and for IPv4 meter action.

**openflow-optimised-3**

Specifies a profile optimized for Layers 2 and 3 and for IPv6 meter action.

**vxlan-ext**

Specifies a profile optimized for VXLAN transit, for termination, and for GRE.

## Modes

Privileged EXEC mode

## Examples

The following example displays details of the current active hardware profile.

```
device# show hardware profile current
switch type: BR-SLX9850-4

current TCAM profile:    DEFAULT
-----
      12-acl:            2038
      13v4-acl:          6134
      13v6-acl:          6134
      13v4-acl-vxlan:    0
      1213v40f:          0
      egr12-acl:         2038
      egr13-acl:         2038
-----

current LAG profile:    LAG-DEFAULT
-----
      max-lag:           256
-----

current COUNTERS profile: COUNTERS-DEFAULT
-----
      InLIF - HitCount:  32768
      InL4  - HitCount:  16384
      OutLIF - HitCount:  16384
      OutL4 - HitCount:   0
-----
```



The following example displays details of the default counters profile.

```
device# show hardware profile counters default
switch type: BR-SLX9850-4
```

COUNTERS profile:		COUNTERS-DEFAULT
InLIF - HitCount:		32768
InL4 - HitCount:		16384
OutLIF - HitCount:		16384
OutL4 - HitCount:		0

The following example displays information about a specified LAG profile.

```
device# show hardware profile lag lag-profile-1
switch type: BR-SLX9850-4
```

LAG profile:	LAG-PROFILE-1
max-lag:	512

The following example displays information about a specified TCAM profile.

```
device# show hardware profile tcam layer-2-optimised-1
switch type: BR-SLX9850-4
```

TCAM profile:		LAYER2-OPT-1
12-acl:		6134
13v4-acl:		6134
13v6-acl:		2038
13v4-acl-vxlan:		0
1213v40f:		0
egr12-acl:		1014
egr13-acl:		1014

## History

Release version	Command history
16r.1.00	This command was introduced.

# show hardware port-group

Displays the port groups and their ports for the SLX 9850 36x100G line cards.

## Syntax

```
show hardware port-group
```

## Modes

Privileged EXEC mode

## Usage Guidelines

This command is not relevant for SLX 9540 devices.

## Command Output

The **show hardware port-group** command displays the following information:

Output field	Description
Port-Group	Port group number.
Port	Port numbers for the port group.

## Examples

The following example displays the port groups and their ports.

```
device# show hardware port-group
Port-Group          Port
=====
3/1                 3/1 ,2 ,3 ,4 ,5 ,6 ,7 ,26 ,27 ,28
3/2                 3/8 ,9 ,10 ,11 ,12 ,13 ,29 ,30 ,31 ,32
3/3                 3/15 ,16 ,17 ,18 ,19 ,20 ,14 ,33 ,34 ,35
3/4                 3/41 ,42 ,43 ,44 ,45 ,46 ,21 ,22 ,23 ,24
3/5                 3/48 ,49 ,50 ,51 ,52 ,53 ,25 ,36 ,47 ,54
3/6                 3/55 ,56 ,57 ,58 ,59 ,60 ,37 ,38 ,39 ,40
```

\* Only the first six ports in each group are 100g capable ports

## History

Release version	Command history
16r.1.00	This command was introduced.

# show history

Displays the history of commands executed on the device during the current session.

## Syntax

```
show history [ number ]
```

## Parameters

*number*

Specifies the number of commands to display. Values range from 1 through 1000.

## Modes

Privileged EXEC mode

## Usage Guidelines

If you enter this command without specifying a number, up to 1000 commands are displayed.

## Examples

The following command displays the four last commands entered.

```
device# show history 4
12:45:06 -- show hardware port-group
12:45:23 -- show interface switchport
12:45:37 -- show interface stats brief
12:45:45 -- show arp vrf test
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show http server status

Displays HTTP and HTTPS server status information.

## Syntax

```
show http server status
```

## Modes

Privileged EXEC mode

## Command Output

The **show http server status** command displays the following information:

Output field	Description
VRF-Name	VRF name
Status	HTTP and HTTPS server status (enabled or disabled)

## Examples

The following example displays HTTP and HTTPS server status information.

```
device# show http server status
VRF-Name: mgmt-vrf      Status: HTTP Enabled and HTTPS Disabled
VRF-Name: default-vrf  Status: HTTP Enabled and HTTPS Disabled
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show image-snapshot

Displays snapshot file information for installing device firmware from Open Network Install Environment (ONIE).

## Syntax

```
show image-snapshot
```

## Modes

Privileged EXEC mode

## Usage Guidelines

## Examples

Example of a typical snapshot file information.

```
# show image-snapshot
SLX-OS Operating System Software
SLX-OS Operating System Version: 16r.1.01
Copyright (c) 1995-2016 Brocade Communications Systems, Inc.
Firmware name:      16r.1.01d
Build Time:         00:43:27 Nov 19, 2016
Install Time:       23:30:11 Nov 22, 2016
Kernel:            2.6.34.6
HOST Kernel:       3.14.17
Snapshot Time:     Tue Nov 22 22:20:43 PST 2016
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# show interface

Displays the detailed interface configuration and capabilities of all interfaces or for specified interfaces.

## Syntax

**show interface** [ *description* ]

**show interface** [ *ethernet slot / port* | **port-channel** *number* ] [ **switchport** ]

**show interface loopback** *number*

**show interface management** [ *management-id* ]

**show interface trunk**

## Parameters

### **description**

For all device interfaces, displays a summary that includes the Description field.

### **ethernet**

Specifies an Ethernet interface.

*slot*

Specifies a valid slot number.

*port*

Specifies a valid port number.

### **port-channel** *number*

Specifies a port-channel number. Depending on the platform, valid values range from 1 through 1024.

### **switchport**

Specifies Layer 2 interfaces.

### **loopback** *number*

Specifies a loopback interface.

### **management** *management-id*

Specifies a management interface.

### **trunk**

Displays VLANs on the trunk.

## Modes

Privileged EXEC mode

## Command Output

The **show interface ethernet** command displays the following information:

Output field	Description
Ethernet <i>slot / port</i>	Displays the port state. The states are "admin down, line protocol is down (admin down)" or "up, line protocol is up (connected)".
Hardware	Displays the MAC address of the Ethernet interface.
Pluggable media	Displays "present" or "not present".
Interface index	Displays the interface index.
MTU	Displays the maximum transmission unit (MTU), in bytes.
<i>n</i> G interface	Displays the speed of the Ethernet interface, in Gb.
LineSpeed Actual	Displays the actual line speed in Mb or "Nil".
LineSpeed Configured	Displays "Auto" or a value in Mb.
Duplex	Displays "Half" or "Full".
Priority Tab	Displays "enable" or "disable".
Forward LACP PDU	Displays "enable" or "disable".
Route Only	Displays "enabled" or "disabled".
Queueing strategy	Displays "FIFO".
Primary Internet Address	Displays the primary Internet address
Broadcast	Displays the broadcast Internet address
Receive Statistics	Displays receive statistics: packets, bytes, unicasts, multicasts, broadcasts, packets by byte size, runts, jabbers, cyclic redundancy check (CRC), overruns, errors, and discards.
Transmit Statistics	Displays transmit statistics: packets, bytes, unicasts, multicasts, broadcasts, underruns, errors, and discards.
Rate info	Displays input and output in Mbits/sec, packets/sec, and percentage of the line rate.
Route-Only Packets Dropped	Displays the number of routing-only packets dropped.

The **show interface loopback** command displays the following information:

Output field	Description
Loopback	Displays the loopback number and state and the line protocol state. The states are "Loopback <i>nn</i> is up", "Loopback <i>nn</i> is admin down, line protocol is down (admin down). "
Hardware	Displays "is Loopback".
Pluggable media	Displays "present" or "not present".
Interface index	Displays the interface index.
MTU	Displays the maximum transmission unit (MTU), in bytes.
LineSpeed Actual	Displays the actual line speed in Mb or "Nil".
LineSpeed Configured	Displays "Auto" or a value in Mb.
Last clearing of show interface counters:	In days, hours, and minutes, displays how much time elapsed since the last counter clear.
Queueing strategy	Displays "FIFO".
Primary Internet Address	Displays the primary Internet address.

The **show interface ethernet management** command displays the following information:

Output field	Description
LineSpeed Actual	Displays "100000baseT" (100Gb), "40000baseT" (40Gb), "25000baseT" (25Gb), "10000baseT" (10Gb), or "1000baseT" (1Gb).
Duplex	Displays "Half" or "Full".

Output field	Description
LineSpeed Configured	Displays "Auto" or a value in Mb.
oper-status	Displays "up" or "down".
ip address	Displays "static" or "dynamic" and the IPv4 address.
ip gateway-address	Displays the IPv4 gateway address.
ipv6 ipv6-address	Displays the IPv6 address.
ipv6 ipv6-gateways	Displays the IPv6 gateway address.

The **show interface ethernet switchport** command displays the following information:

Output field	Description
Interface name	Displays "Ethernet <i>slot / port</i> " or "Port-channel <i>nn</i> ".
Switchport mode	Displays "access", "trunk", or "trunk-no-default-native".
Ingress filter	Displays "enable".
Acceptable frame types	Displays "vlan-tagged only", "vlan-untagged only", or "all".
Native Vlan	Displays the ID number of the native VLAN.
Active Vlans	Displays ID numbers of the active VLANs.
MAC learn disable Vlans	Displays VLANs for which MAC learning is disabled.

The **show interface trunk** command displays the following information:

Output field	Description
Port	Displays the Ethernet ports by <i>slot / port</i> .
Vlans Allowed on Trunk	Displays "Nil" or a list of the VLANs allowed on the trunk.



## Examples

The following example displays detailed information for a specified Ethernet interface.

```
device# show interface ethernet 3/4
Ethernet 3/4 is up, line protocol is up (connected)
Hardware is Ethernet, address is 768d.f804.ca08
  Current address is 768d.f804.ca08
Pluggable media present
Interface index (ifindex) is 207650816
MTU 1548 bytes
IP MTU 1500 bytes
10G Interface
LineSpeed Actual      : 10000 Mbit
LineSpeed Configured : Auto, Duplex: Full
Priority Tag disable
Forward LACP PDU: Disable
Route Only: Disabled
Last clearing of show interface counters: 11:59:37
Queueing strategy: fifo
  Primary Internet Address is 12.2.1.2/24 broadcast is 12.2.1.255
Receive Statistics:
  45756 packets, 34003184 bytes
  Unicasts: 9094, Multicasts: 36650, Broadcasts: 12
  64-byte pkts: 1438, Over 64-byte pkts: 8113, Over 127-byte pkts: 1786
  Over 255-byte pkts: 10132, Over 511-byte pkts: 8432, Over 1023-byte pkts: 15855
  Over 1518-byte pkts(Jumbo): 0
  Runts: 0, Jabbers: 0, CRC: 0, Overruns: 0
  Errors: 0, Discards: 0
Transmit Statistics:
  33405 packets, 25357172 bytes
  Unicasts: 10232, Multicasts: 23162, Broadcasts: 10
  Underruns: 0
  Errors: 0, Discards: 0
Rate info:
  Input 0.000000 Mbits/sec, 0 packets/sec, 0.00% of line-rate
  Output 0.000333 Mbits/sec, 0 packets/sec, 0.00% of line-rate
Route-Only Packets Dropped: 0
```

The following example displays detailed information for a specified management interface.

```
device# show interface management 1
interface Management 1
  line-speed actual "1000baseT, Duplex: Full"
  line-speed configured Auto
  oper-status up
  ip address "static 10.17.110.59/20"
  ip gateway-address 10.17.114.1
  ipv6 ipv6-address [ ]
  ipv6 ipv6-gateways [ fe80::21b:edff:fe0b:9000 fe80::21b:edff:fe0b:3c00 ]
```

The following example displays detailed information for a specified loopback interface.

```
device# show interface loopback 1
Loopback 1 is up, line protocol is up
Hardware is Loopback
Pluggable media not present
Interface index (ifindex) is 1476395009
IP MTU 1500 bytes
LineSpeed Actual      : Nil
LineSpeed Configured : Auto
Last clearing of show interface counters: 00:00:23
Queueing strategy: fifo
  Primary Internet Address is 50.1.1.1/32
```

show interface

The following example displays details of a specified Layer 2 interface.

```
device# show interface switchport 1/15
Interface name      : Ethernet 1/15
Switchport mode    : trunk
Ingress filter      : enable
Acceptable frame types : vlan-tagged only
Native Vlan         : 1
Active Vlans        : 1-201
MAC learn disable Vlans : -
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show interface stats brief

Displays a brief list of device or line-card interface statistics.

## Syntax

```
show interface stats brief [ slot line-card-number ]
```

## Parameters

**slot** *line-card-number*

(SLX 9850 series only) Specifies a line card.

## Modes

Privileged EXEC mode

## Examples

The following example displays brief interface statistics for a specified line card.

```
device# show interface stats brief slot 2
```

Interface	Packets		Error		Discards		CRC rx
	rx	tx	rx	tx	rx	tx	
Eth 2/1	44127	38570	0	0	0	0	0
Eth 2/2	0	0	0	0	0	0	0
Eth 2/3	37319	38572	0	0	0	0	0
Eth 2/4	0	0	0	0	0	0	0
Eth 2/5	37319	38853	0	0	0	0	0
Eth 2/6	0	0	0	0	0	0	0
Eth 2/7	0	0	0	0	0	0	0
Eth 2/8	0	0	0	0	0	0	0
Eth 2/9	4735	6859	0	0	0	0	0
Eth 2/10	37319	45808	0	0	0	0	0
Eth 2/11	290725948	22923725	0	0	0	0	0
Eth 2/12	0	0	0	0	0	0	0
Eth 2/13	3395530417	37764	0	0	0	0	0
Eth 2/14	0	0	0	0	0	0	0
Eth 2/15	0	0	0	0	0	0	0
Eth 2/16	0	0	0	0	0	0	0
Eth 2/17	0	0	0	0	0	0	0
Eth 2/18	0	0	0	0	0	0	0
Eth 2/19	0	0	0	0	0	0	0
Eth 2/20	0	0	0	0	0	0	0
...							
Eth 2/57	559837487	20446529	0	0	0	0	0
Eth 2/58	37315	39887	0	0	0	0	0
Eth 2/59	37313	38567	0	0	0	0	0
Eth 2/60	15046998	38571	0	0	0	0	0
Eth 2/61	162123590	38566	0	0	0	0	0
Eth 2/62	164529088	3095486	0	0	0	0	0
Eth 2/63	42510	38570	0	0	0	0	0
Eth 2/64	37312	47235	0	0	0	0	0
Eth 2/65	0	0	0	0	0	0	0
Eth 2/66	2023	3289	0	0	0	0	0
Eth 2/67	365498908	37764	0	0	0	0	0

show interface stats brief

## History

Release version	Command history
16r.1.00	This command was introduced.

# show interface stats detail

Displays a detailed list of device or line-card interface statistics.

## Syntax

```
show interface stats detail
```

```
show interface stats detail interface { ethernet slot / port | port-channel index }
```

```
show interface stats detail slot line-card-number
```

## Parameters

### interface

Specifies what type of interface is displayed.

### ethernet

Specifies an Ethernet interface.

*slot*

Specifies a valid slot number.

*port*

Specifies a valid port number.

### port-channel

Specifies a port channel interface.

*index*

Specifies the port channel number. Depending on the platform, the number ranges from 1 through 512.

### slot *line-card-number*

(SLX 9850 series only) Specifies a line card.

## Modes

Privileged EXEC mode



# show interface stats utilization-watermark

Displays high and low—incoming and outgoing—current hour, previous hour, current 24-hour, and previous 24-hour traffic watermarks.

## Syntax

```
show interface stats utilization-watermark
```

```
show interface stats utilization-watermark interface { ethernet slot / port | port-channel index }
```

```
show interface stats utilization-watermark slot line-card-number
```

## Parameters

### interface

Specifies what type of interface to display.

### ethernet

Specifies an Ethernet interface.

### slot

Specifies a valid slot number.

### port

Specifies a valid port number.

### port-channel index

Specifies a port-channel number. Depending on the platform, valid values range from 1 through 1024.

### slot line-card-number

(SLX 9850 series only) Specifies a line card.

## Modes

Privileged EXEC mode

## Usage Guidelines

You can filter the results by interface or by line card.

## Command Output

The **show interface stats utilization-watermark** command displays the following information:

Output field	Description
Cur1Hr-InHigh	Displays the high watermark for incoming traffic during the current hour.
Cur1Hr-InLow	Displays the low watermark for incoming traffic during the current hour.
Cur1Hr-OutHigh	Displays the high watermark for outgoing traffic during the current hour.
Cur1Hr-OutLow	Displays the low watermark for outgoing traffic during the current hour.

Output field	Description
Last1Hr-InHigh	Displays the high watermark for incoming traffic during the previous hour.
Last1Hr-InLow	Displays the low watermark for incoming traffic during the previous hour.
Last1Hr-OutHigh	Displays the high watermark for outgoing traffic during the previous hour.
Last1Hr-OutLow	Displays the low watermark for outgoing traffic during the previous hour.
Cur24Hr-InHigh	Displays the high watermark for incoming traffic during the current 24 hours.
Cur24Hr-InLow	Displays the low watermark for incoming traffic during the current 24 hours.
Cur24Hr-OutHigh	Displays the high watermark for outgoing traffic during the current 24 hours.
Cur24Hr-OutLow	Displays the low watermark for outgoing traffic during the current 24 hours.
Last24Hr-InHigh	Displays the high watermark for incoming traffic during the previous 24 hours.
Last24Hr-InLow	Displays the low watermark for incoming traffic during the previous 24 hours.
Last24Hr-OutHigh	Displays the high watermark for outgoing traffic during the previous 24 hours.
Last24Hr-OutLow	Displays the low watermark for outgoing traffic during the previous 24 hours.

## Examples

The following example displays utilization watermarks for a specified Ethernet interface.

```
device# show interface stats utilization-watermark interface ethernet 1/1
```

```
Starting time of watermark windows:
Cur1Hr : Apr  4 08:11:19          Cur24Hr : Apr  4 03:11:18
```

```
Interface eth1/1 statistics watermark
                                Mbits/Sec          Pkts/Sec          Time
Cur1Hr-InHigh   :          0.000000              0              00:00:00
Cur1Hr-InLow    :          0.000000              0              00:00:00
Cur1Hr-OutHigh  :          0.000000              0              00:00:00
Cur1Hr-OutLow   :          0.000000              0              00:00:00
Last1Hr-InHigh   :          0.000000              0              00:00:00
Last1Hr-InLow    :          0.000000              0              00:00:00
Last1Hr-OutHigh  :          0.000000              0              00:00:00
Last1Hr-OutLow   :          0.000000              0              00:00:00
Cur24Hr-InHigh  :          0.000000              0              00:00:00
Cur24Hr-InLow   :          0.000000              0              00:00:00
Cur24Hr-OutHigh :          0.000000              0              00:00:00
Cur24Hr-OutLow  :          0.000000              0              00:00:00
Last24Hr-InHigh  :          0.000000              0              00:00:00
Last24Hr-InLow   :          0.000000              0              00:00:00
Last24Hr-OutHigh :          0.000000              0              00:00:00
Last24Hr-OutLow  :          0.000000              0              00:00:00
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# show interface status

Displays the status of all device interfaces.

## Syntax

**show interface status**

## Modes

Privileged EXEC mode

## Command Output

The **show interface status** command displays the following information:

Output field	Description
Port	Displays the physical port or port channel.
Status	Displays the port status. The states are "adminDown", "notconnected", "connected (up)", or "sfpAbsent".
Mode	Displays "access" or "trunk".
Speed	Displays the speed of the Ethernet interface, in Gb.
Type	Displays 1G-SFP, 10G-SFP-LR, 10G-SFP-SR, 10G-SFP-SX, 40G-QSFP, or 100G.
Description	Displays a Description defined for the port.

## Examples

The following example displays the status of all device interfaces.

```
device# show interface status
-----
Port          Status      Mode      Speed   Type      Description
-----
Eth 1/1       adminDown  --        --      --
Eth 1/2       adminDown  --        --      --
Eth 1/3       adminDown  --        --      --
...
Eth 1/15      notconnected --        --      40G-QSFP  -
...
Eth 3/4       connected (up) --        10G     10G-SFP-SR
(output truncated)
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show inventory

Displays the hardware inventory of the device.

## Syntax

```
show inventory [ chassis | fan | module | powerSupply ]
```

## Parameters

### chassis

Displays information about the chassis.

### fan

Displays information about the fan.

### module

Displays information about the module.

### powerSupply

Displays information about the power supply.

## Modes

Privileged EXEC mode

## Examples

The following is an example of typical command output.

```
device# show inventory

NAME:MM, Slot M1  DESCR:Chassis Blade module
PN:60-1004051-13  SN:DCR3225N00S

NAME:MM, Slot M2  DESCR:Chassis Blade module
PN:60-1003376-02  SN:DCR0344M00V

NAME:SFM, Slot S4  DESCR:Chassis Blade module
PN:60-1003092-05  SN:DUB0340L01M

NAME:SFM, Slot S5  DESCR:Chassis Blade module
PN:60-1003092-05  SN:DUB0340L00B

NAME:SFM, Slot S6  DESCR:Chassis Blade module
PN:60-1003092-05  SN:DUB0340L02V

NAME:LC, Slot L1  DESCR:Chassis Blade module
PN:60-1003190-09  SN:EAM0342L009

NAME:LC, Slot L3  DESCR:Chassis Blade module
PN:60-1003383-02  SN:DZU0342L001

NAME:POWER SUPPLY 1  DESCR:Chassis PS module
PN:23-1000069-01  SN:DUY2M39L0KS

NAME:POWER SUPPLY 2  DESCR:Chassis PS module
PN:23-1000069-01  SN:DUY2M39L0LF

NAME:FAN 1  DESCR:Chassis Fan module
PN:60-1003113-05  SN:DUX0341L017

NAME:FAN 2  DESCR:Chassis Fan module
PN:60-1003113-05  SN:DUX0341L012

NAME:FAN 3  DESCR:Chassis Fan module
PN:60-1003113-05  SN:DUX0341L027

NAME: Chassis  DESCR:System Chassis
SID:BR-SLX9850-4  SwitchType:2000
PN:84-1002709-04  SN:DXC0342L002
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ip arp inspection

Displays Dynamic ARP Inspection (DAI) information for one or more VLANs.

## Syntax

```
show ip arp inspection [ vlan vlan-range ]
```

## Parameters

**vlan** *vlan-range*

Specifies a VLAN, multiple VLANs (separated by commas with no spaces), a range of VLANs, or a combination of specified VLANs and ranges of VLANs. Valid values are from 1 through 4090.

## Modes

Privileged EXEC mode

## Command Output

The **show ip arp inspection** command displays the following information:

Output field	Description
Vlan	Displays the VLAN name.
Configuration	Displays "Enabled" ( <b>ip arp inspection</b> ) or "Disabled" ( <b>no ip arp inspection</b> ).
Operation	Displays "Active" if ARP configuration is successfully saved to the database.  "Inactive" indicates one of the following conditions: <ul style="list-style-type: none"> <li>The "Configuration" value is "Disabled".</li> <li>There is an internal issue that prevents successful application of ACLs.</li> </ul> Displays "Partial" if ARP ACLs are successfully applied to one or more line cards but not to all of them.
ACL Match	Displays the name of the ARP ACL that is applied.

## Examples

The following example displays DAI information for all VLANs.

```
device# show ip arp inspection
  Vlan  Configuraton  Operation  ACL Match
-----
    1      Enabled      Active
   10     Disabled     Inactive
  100     Enabled      Active      ac11
 1000     Enabled      Active
   20     Disabled     Inactive
  200     Disabled     Inactive
 2000     Enabled      Active      ac11
```

The following example displays DAI information for specified VLANs and a range of VLANs.

```
device# show ip arp inspection vlan 1,100,200-2000
Vlan  Configuraton  Operation  ACL Match
-----
  1      Enabled        Active
 100     Enabled        Active      ac11
1000    Enabled        Active
 200     Disabled       Inactive
2000    Enabled        Active      ac11
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# show ip arp inspection interfaces

Displays a list of trusted interfaces on VLANs enabled for Dynamic ARP Inspection (DAI).

## Syntax

```
show ip arp inspection interfaces [ ethernet slot / port | port-channel index ]
```

## Parameters

### ethernet

Specifies a physical Ethernet interface.

### slot

Specifies a valid slot number.

### port

Specifies a valid port number.

### port-channel index

Specifies a port-channel interface.

## Modes

Privileged EXEC mode

## Usage Guidelines

On VLANs enabled for Dynamic ARP Inspection (DAI), interfaces not listed in the command output are untrusted.

## Command Output

The **show ip arp inspection interfaces** command displays the following information:

Output field	Description
Interface	Displays a prefix specifying the interface type, followed by the interface identifier.
Trust State	Displays "Trusted".

## Examples

The following example displays all trusted interfaces.

```
device# show ip arp inspection interfaces
Interface      Trust State
-----
Po 200         Trusted
Eth 2/0        Trusted
Eth 4/0        Trusted
-----
```

All other interfaces are untrusted.

The following example displays the trust state of Ethernet interface 4/0.

```
device# show ip arp inspection interfaces ethernet 4/0
Interface      Trust State
-----
Eth 4/0        Trusted
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# show ip bgp

Displays BGP4 route information.

## Syntax

**show ip bgp**

**show ip bgp** *ip-addr* [ */prefix* ]

**show ip bgp** *ip-addr* [ */prefix* ] [ **longer-prefixes** ] [ **vrf** *vrf-name* ]

## Parameters

*ip-addr*

IPv4 address of a neighbor in dotted-decimal notation, with optional mask.

*/prefix*

IPv4 mask length in CIDR notation.

**longer-prefixes**

Filters on prefixes equal to or greater than that specified by *prefix*.

**vrf** *vrf-name*

Specifies a VRF instance.

## Modes

Privileged EXEC mode

## Examples

This example displays sample output from the **show ip bgp** command.

```
device# show ip bgp
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# show ip bgp attribute-entries

Displays BGP4 route-attribute entries that are stored in device memory.

## Syntax

```
show ip bgp attribute-entries [ vrf vrf-name ]
```

## Parameters

**vrf** *vrf-name*

Specifies a VRF instance.

## Modes

Privileged EXEC mode

## Usage Guidelines

The route-attribute entries table lists the sets of BGP4 attributes that are stored in device memory. Each set of attributes is unique and can be associated with one or more routes. In fact, the device typically has fewer attribute entries than routes. Use this command to view BGP4 route-attribute entries that are stored in device memory.

## Examples

The following example show sample output for the **show ip bgp attribute-entries** command.

```
device# show ip bgp attribute-entries
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ip bgp dampened-paths

Displays all BGP4 dampened routes..

## Syntax

```
show ip bgp dampened-paths [ vrf vrf-name ]
```

## Parameters

**vrf** *vrf-name*

Specifies a VRF instance.

## Modes

Privileged EXEC mode

## Examples

The following example shows sample output from the **show ip bgp dampened-paths** command.

```
device# show ip bgp dampened-paths
```

```

      Status Code  >:best d:damped h:history *:valid
      Network      From          Flaps  Since      Reuse      Path
*d  110.110.114.0/24  160.160.160.10  38     0 :3 :49   0 :10:10   111
*d  110.110.113.0/24  160.160.160.10  38     0 :3 :49   0 :10:10   111
*d  110.110.112.0/24  160.160.160.10  38     0 :3 :49   0 :10:10   111
*d  110.110.111.0/24  160.160.160.10  38     0 :3 :49   0 :10:10   111
*d  110.110.110.0/24  160.160.160.10  38     0 :3 :49   0 :10:10   111

```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ip bgp filtered-routes

Displays BGP4 filtered routes that are received from a neighbor or peer group.

## Syntax

```
show ip bgp filtered-routes [ detail ] [ ip-addr { / mask } [ longer-prefixes ] ] | as-path-access-list name | prefix-list name ]
[ vrf vrf-name ]
```

## Parameters

### detail

Optionally displays detailed route information.

### ip-addr

IPv4 address of the destination network in dotted-decimal notation.

### mask

(Optional) IPv4 mask of the destination network in CIDR notation.

### longer-prefixes

Specifies all statistics for routes that match the specified route, or that have a longer prefix than the specified route.

### as-path-access-list name

Specifies an AS-path ACL. The name must be between 1 and 32 ASCII characters in length.

### prefix-list name

Specifies an IP prefix list. The name must be between 1 and 32 ASCII characters in length.

### vrf vrf-name

Specifies a VRF instance.

## Modes

Privileged EXEC mode

## Examples

This example displays BGP4 filtered routes.

```
device# show ip bgp filtered-routes 10.11.12.13 prefix-list myprefixlist
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ip bgp flap-statistics

Displays BGP4 route-dampening statistics for all dampened routes with a variety of options.

## Syntax

```
show ip bgp flap-statistics
```

```
show ip bgp flap-statistics ip-addr { / mask } [ longer-prefixes [ vrf vrf-name ] | vrf vrf-name ]
```

```
show ip bgp flap-statistics neighbor ip-addr [ vrf vrf-name ]
```

```
show ip bgp flap-statistics regular-expression name [ vrf vrf-name ]
```

```
show ip bgp flap-statistics vrf vrf-name
```

## Parameters

*ip-addr*

IPv4 address of a specified route in dotted-decimal notation.

*mask*

IPv4 mask of a specified route in CIDR notation.

**longer-prefixes**

Displays statistics for routes that match the specified route or have a longer prefix than the specified route.

**vrf** *vrf-name*

Specifies a VRF instance.

**neighbor**

Displays flap statistics only for routes learned from the specified neighbor.

*ip-addr*

IPv4 address of the neighbor.

**regular-expression**

Specifies a regular expression in the display output on which to filter.

*name*

Name of an AS-path filter or regular expression.

## Modes

Privileged EXEC mode

## Examples

The following example displays flap statistics for a neighbor.

```
device# show ip bgp flap-statistics neighbor 10.11.12.13
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ip bgp neighbors

Displays configuration information and statistics for BGP4 neighbors of the device.

## Syntax

```
show ip bgp neighbors [ ip-addr ]  
show ip bgp neighbors last-packet-with-error [ vrf vrf-name ]  
show ip bgp neighbors routes-summary [ vrf vrf-name ]  
show ip bgp neighbors vrf vrf-name
```

## Parameters

*ip-addr*  
IPv4 address of a neighbor in dotted-decimal notation.

**last-packet-with-error**  
Displays the last packet with an error.

**route-summary**  
Displays routes received, routes accepted, number of routes advertised by peer, and so on.

**vrf** *vrf-name*  
Specifies a VRF instance.

## Modes

Privileged EXEC mode

## Usage Guidelines

Use this command to view configuration information and statistics for BGP4 neighbors of the device. Output shows all configured parameters for the neighbors. Only the parameters whose values differ from defaults are shown.

## Examples

The following example shows sample output from the show ip bgp neighbors command.

```
device# show ip bgp neighbors

Total number of BGP Neighbors: 2

1  IP Address: 123.123.123.3, AS: 333 (EBGP), RouterID: 9.9.9.9, VRF: default-vrf
   State: ESTABLISHED, Time: 0h1m32s, KeepAliveTime: 60, HoldTime: 180
     KeepAliveTimer Expire in 17 seconds, HoldTimer Expire in 147 seconds
   Minimal Route Advertisement Interval: 0 seconds
     RefreshCapability: Received
   Messages:   Open   Update   KeepAlive   Notification   Refresh-Req
     Sent      : 2     15     3339        1                0
     Received: 2     0     3356        0                0
   Last Update Time: NLRI                               Withdraw      NLRI              Withdraw
                   Tx: 0h1m32s                         ---            Rx: ---          ---
   Last Connection Reset Reason: User Reset Peer Session
   Notification Sent:      Cease/Administrative Reset
   Notification Received: Unspecified
   Neighbor NLRI Negotiation:
     Peer configured for IPV4 unicast Routes
   Neighbor ipv6 MPLS Label Capability Negotiation:
   Neighbor AS4 Capability Negotiation:
   Outbound Policy Group:
     ID: 2, Use Count: 2
   BFD: Disabled
     Byte Sent: 146, Received: 0
     Local host: 123.123.123.2, Local Port: 44575
     Remote host: 123.123.123.3, Remote Port: 179

2  IP Address: 160.160.160.10, AS: 111 (EBGP), RouterID: 193.24.0.1, VRF: default-vrf
   State: ESTABLISHED, Time: 0h1m33s, KeepAliveTime: 30, HoldTime: 90
     KeepAliveTimer Expire in 12 seconds, HoldTimer Expire in 86 seconds
   Minimal Route Advertisement Interval: 0 seconds
     RefreshCapability: Received
   Messages:   Open   Update   KeepAlive   Notification   Refresh-Req
     Sent      : 8     0     553         5                0
     Received: 8     9     498         0                0
   Last Update Time: NLRI                               Withdraw      NLRI              Withdraw
                   Tx: ---                               ---            Rx: 0h1m33s      ---
   Last Connection Reset Reason: User Reset Peer Session
   Notification Sent:      Cease/Administrative Reset
   Notification Received: Unspecified
   Neighbor NLRI Negotiation:
     Peer configured for IPV4 unicast Routes
   Neighbor ipv6 MPLS Label Capability Negotiation:
   Neighbor AS4 Capability Negotiation:
   Outbound Policy Group:
     ID: 2, Use Count: 2
   BFD: Disabled
     Byte Sent: 121, Received: 0
     Local host: 160.160.160.20, Local Port: 53791
     Remote host: 160.160.160.10, Remote Port: 179
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ip bgp neighbors advertised-routes

Displays the routes that the device has advertised to the neighbor during the current BGP4 session.

## Syntax

```
show ip bgp neighbors ip-addr advertised-routes [ detail | / mask-bits ] [ vrf vrf-name ]
```

## Parameters

*ip-addr*

IPv4 address of a neighbor in dotted-decimal notation.

**detail**

Displays details of advertised routes.

*mask-bits*

Number of mask bits in CIDR notation.

**vrf** *vrf-name*

Specifies a VRF instance.

## Modes

Privileged EXEC mode

## Examples

This example displays the details of advertised routes.

```
device# show ip bgp neighbors 123.123.123.3 advertised-routes

      There are 5 routes advertised to neighbor 123.123.123.3
Status A:AGGREGATE B:BEST b:NOT-INSTALLED-BEST E:EBGP I:IBGP L:LOCAL
Prefix      Next Hop      MED      LocPrf      Weight      Status
1  110.110.110.0/24  123.123.123.2    0
   AS_PATH: 222 111
2  110.110.111.0/24  123.123.123.2    0
   AS_PATH: 222 111
3  110.110.112.0/24  123.123.123.2    0
   AS_PATH: 222 111
4  110.110.113.0/24  123.123.123.2    0
   AS_PATH: 222 111
5  110.110.114.0/24  123.123.123.2    0
   AS_PATH: 222 111
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# show ip bgp neighbors flap-statistics

Displays the route flap statistics for routes received from or sent to a BGP4 neighbor.

## Syntax

```
show ip bgp neighbors ip-addr flap-statistics [ vrf vrf-name ]
```

## Parameters

*ip-addr*

IPv4 address of a neighbor in dotted-decimal notation.

**vrf** *vrf-name*

Specifies a VRF instance.

## Modes

Privileged EXEC mode

## Examples

This example shows flap statistics.

```
device#
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ip bgp neighbors last-packet-with-error

Displays information about the last packet that contained an error from any of a device's neighbors.

## Syntax

```
show ip bgp neighbors ip-addr last-packet-with-error [ decode ] [ vrf vrf-name ]
```

## Parameters

*ip-addr*

IP address of a neighbor in dotted-decimal notation.

**decode**

Decodes last packet that contained an error from any of a device's neighbors.

**vrf** *vrf-name*

Specifies a VRF instance.

## Modes

Privileged EXEC mode

## Examples

This example shows sample output from the **show ip bgp neighbors last-packet-with-error** command when no packet from a specified neighbor contained an error.

```
device# show ip bgp neighbors 123.123.123.3 last-packet-with-error
```

```
Received Message Length: 45
BGP Message:
 0xffffffff 0xffffffff 0xffffffff 0xffffffff 0x002d0104
 0x014b00b4 0x09090909 0x10020601 0x04010000 0x01020202
 0x00020280 0x00
```

```
BGP Header
Marker: 0xffffffff 0xffffffff 0xffffffff 0xffffffff
Message Length: (0x002d) 45
Message Type: (0x01) OPEN
```

```
OPEN Message
Version: (0x04) 4
AS Number: (0x014b) 331
Hold Time: (0x00b4) 180
BGP Identifier: (0x09090909) 9.9.9.9
Optional Parameter length: (0x10) 16
```

```
OPEN message optional parameters
Parameter Type: (0x02) Capability
Parameter Length: (0x06) 6
  Capability Type: (0x01) MULTIPROTOCOL EXTENSIONS
  Capability Length: (0x04) 4
  AFI: (0x0100) Unknown(256)
  Reserved: (0x00) 0
  SAFI: (0x01) Unicast
```

```
Parameter Type: (0x02) Capability
Parameter Length: (0x02) 2
  Capability Type: (0x02) ROUTE REFRESH(new)
  Capability Length: (0x00) 0
```

```
Parameter Type: (0x02) Capability
Parameter Length: (0x02) 2
  Capability Type: (0x80) ROUTE REFRESH(old)
  Capability Length: (0x00) 0
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ip bgp neighbors received

Displays Outbound Route Filters (ORFs) received from BGP4 neighbors of the device.

## Syntax

```
show ip bgp neighbors ip-addr received
show ip bgp neighbors ip-addr received detail [ vrf vrf-name ]
show ip bgp neighbors ip-addr received prefix-filter [ vrf vrf-name ]
show ip bgp neighbors ip-addr vrf vrf-name
```

## Parameters

*ip-addr*  
IPv4 address of a neighbor in dotted-decimal notation.

**detail**  
Displays detailed information for ORFs received from BGP4 neighbors of the device.

**vrf** *vrf-name*  
Specifies a VRF instance.

**prefix-filter**  
Displays the results for ORFs that are prefix-based.

## Modes

Privileged EXEC mode

## Examples

The following example displays output for the **show ip bgp neighbors received** command.

```
device# show ip bgp neighbors 10.5.5.6 received
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ip bgp neighbors received-routes

Lists all route information received in route updates from BGP4 neighbors of the device since the soft-reconfiguration feature was enabled.

## Syntax

```
show ip bgp neighbors ip-addr received-routes [ detail ] [ vrf vrf-name ]
```

## Parameters

*ip-addr*

IPv4 address of a neighbor in dotted-decimal notation.

**detail**

Displays detailed route information.

**vrf** *vrf-name*

Specifies a VRF instance.

## Modes

Privileged EXEC mode

## Examples

The following example displays output for the **show ip bgp neighbors received-routes** command.

```
device# show ip bgp neighbors 160.160.160.10 received-routes

      There are 5 received routes from neighbor 160.160.160.10
Status A:AGGREGATE B:BEST b:NOT-INSTALLED-BEST C:CONFED_EBGP D:DAMPED
      E:EBGP H:HISTORY I:IBGP L:LOCAL M:MULTIPATH m:NOT-INSTALLED-MULTIPATH
      S:SUPPRESSED F:FILTERED s:STALE
      Prefix      Next Hop      MED      LocPrf      Weight      Status
  1      110.110.110.0/24  160.160.160.10  0          100         0          BE
      AS_PATH: 111
  2      110.110.111.0/24  160.160.160.10  0          100         0          BE
      AS_PATH: 111
  3      110.110.112.0/24  160.160.160.10  0          100         0          BE
      AS_PATH: 111
  4      110.110.113.0/24  160.160.160.10  0          100         0          BE
      AS_PATH: 111
  5      110.110.114.0/24  160.160.160.10  0          100         0          BE
      AS_PATH: 111
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ip bgp neighbors rib-out-routes

Displays information about BGP4 outbound RIB routes.

## Syntax

```
show ip bgp neighbors ip-addr rib-out-routes ip-addr mask [ vrf vrf-name ]
show ip bgp neighbors ip-addr rib-out-routes detail ip-addr mask [ vrf vrf-name ]
show ip bgp neighbors ip-addr rib-out-routes detail [ vrf vrf-name ]
show ip bgp neighbors ip-addr rib-out-routes [ vrf vrf-name ]
```

## Parameters

*ip-addr*  
IP address of a neighbor in dotted-decimal notation.

**vrf** *vrf-name*  
Specifies a VRF instance.

**detail**  
Displays detailed RIB route information.

## Modes

Privileged EXEC mode

## Examples

This example shows sample output from the **show ip bgp neighbors rib-out-routes** command.

```
device# show ip bgp neighbors 123.123.123.3 rib-out-routes

      There are 5 RIB_out routes for neighbor 123.123.123.3
Status A:AGGREGATE B:BEST b:NOT-INSTALLED-BEST E:EBGP I:IBGP L:LOCAL
Prefix      Next Hop      MED      LocPrf      Weight      Status
1      110.110.110.0/24      160.160.160.10      0      100      0      BE
      AS_PATH: 111
2      110.110.111.0/24      160.160.160.10      0      100      0      BE
      AS_PATH: 111
3      110.110.112.0/24      160.160.160.10      0      100      0      BE
      AS_PATH: 111
4      110.110.113.0/24      160.160.160.10      0      100      0      BE
      AS_PATH: 111
5      110.110.114.0/24      160.160.160.10      0      100      0      BE
      AS_PATH: 111
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ip bgp neighbors routes

Lists a variety of route information received in UPDATE messages from BGP4 neighbors.

## Syntax

```
show ip bgp neighbors ip-addr routes
```

```
show ip bgp neighbors ip-addr routes { best | not-installed-best | unreachable } [ vrf vrf-name ]
```

```
show ip bgp neighbors ip-addr routes detail { best | not-installed-best | unreachable } [ vrf vrf-name ]
```

## Parameters

*ip-addr*

IPv4 address of a neighbor in dotted-decimal notation.

**best**

Displays routes received from the neighbor that are the best BGP4 routes to their destination.

**not-installed-best**

Displays routes received from the neighbor that are the best BGP4 routes to their destination but were not installed in the route table because the device received better routes from other sources.

**unreachable**

Displays routes that are unreachable because the device does not have a valid RIP, OSPF, or static route to the next hop.

**vrf** *vrf-name*

Specifies a VRF instance.

## Modes

Privileged EXEC mode

## Examples

The following example displays

```
device# show ip bgp neighbors 10.11.12.13 routes best vrf red
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ip bgp neighbors routes-summary

Lists all route information received in UPDATE messages from BGP4 neighbors.

## Syntax

```
show ip bgp neighbors ip-addr routes-summary [ vrf vrf-name ]
```

## Parameters

*ip-addr*

IPv4 address of a neighbor in dotted-decimal notation.

**vrf** *vrf-name*

Specifies a VRF instance.

## Modes

Privileged EXEC mode

## Examples

The following example displays route summary information received in UPDATE messages.

```
device# show ip bgp neighbors routes-summary
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# show ip bgp peer-group

Displays peer-group information.

## Syntax

```
show ip bgp peer-group peer-group-name [ vrf vrf-name ]
```

## Parameters

*peer-group-name*

Specifies a peer group name.

**vrf** *vrf-name*

Specifies a VRF instance.

## Modes

Privileged EXEC mode

## Usage Guidelines

Only the parameters that have values different from their defaults are listed.

## Examples

This example shows sample output from the **show ip bgp peer-group** command.

```
device# show ip bgp peer-group
1  BGP peer-group is pg
   Address family : IPV4 Unicast
   activate
   Address family : IPV6 Unicast
   no activate
   Members:
   IP Address: 1.1.1.1, AS: 100
   IP Address: 1::1, AS: 100

2  BGP peer-group is pg6
   Address family : IPV4 Unicast
   activate
   Address family : IPV6 Unicast
   no activate
   Currently there are no members
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ip bgp routes

Displays BGP4 route information that is filtered by the table entry at which the display starts.

## Syntax

```
show ip bgp routes [ num | ip-address/prefix | age num | as-path-access-list name | best | cidr-only | community-access-list
name | community-reg-expression expression | detail | local | neighbor ip-addr | nexthop ip-addr | no-best | not-
installed-best | prefix-list string | regular-expression name | route-map name | summary | unreachable ] [ vrf vrf-name ]
```

## Parameters

*num*

Table entry at which the display starts.

*ip-address/prefix*

Table entry at which the display starts.

**age**

Displays BGP4 route information that is filtered by age.

**as-path-access-list** *name*

Displays BGP4 route information that is filtered by autonomous system (AS)-path access control list (ACL). The name must be between 1 and 32 ASCII characters in length.

**best**

Displays BGP4 route information that the device selected as best routes.

**cidr-only**

Displays BGP4 routes whose network masks do not match their class network length.

**community-access-list** *name*

Displays BGP4 route information for an AS-path community access list. The name must be between 1 and 32 ASCII characters in length.

**community-reg-expression** *expression*

Displays BGP4 route information for an ordered community-list regular expression.

**detail**

Displays BGP4 detailed route information.

**local**

Displays BGP4 route information about selected local routes.

**neighbor** *ip-addr*

Displays BGP4 route information about selected BGP neighbors.

**nexthop** *ip-addr*

Displays BGP4 route information about routes that are received from the specified next hop.

**no-best**

Displays BGP4 route information that the device selected as not best routes.

**not-installed-best**

Displays BGP4 route information about best routes that are not installed.

**prefix-list** *string*

Displays BGP4 route information that is filtered by prefix list. The string must be between 1 and 32 ASCII characters in length.

**regular-expression** *name*

Displays BGP4 route information about routes that are associated with the specified regular expression.

**route-map** *name*

Displays BGP4 route information about routes that use the specified route map.

**summary**

Displays BGP4 summary route information.

**unreachable**

Displays BGP4 route information about routes whose destinations are unreachable through any of the BGP4 paths in the BGP4 route table.

**vrf** *vrf-name*

Specifies a VRF instance.

## Modes

Privileged EXEC mode

## Examples

This example shows sample input from the **show ip bgp routes** command when an IP address is specified.

```
device# show ip bgp routes 50.55.55.10

Number of BGP Routes matching display condition : 8
Status A:AGGREGATE B:BEST b:NOT-INSTALLED-BEST C:CONFED_EBGP D:DAMPED
E:EBGP H:HISTORY I:IBGP L:LOCAL M:MULTIPATH m:NOT-INSTALLED-MULTIPATH
S:SUPPRESSED F:FILTERED s:STALE
Prefix      Next Hop      MED      LocPrf      Weight      Status
1  10.55.55.0/24  16.1.1.1      0          100          0          BME
   AS_PATH: 65200 65100
2  10.55.55.0/24  17.1.1.1      0          100          0          ME
   AS_PATH: 65200 65100
3  10.55.55.0/24  19.1.1.1      0          100          0          mE
   AS_PATH: 65200 65100
4  10.55.55.0/24  21.1.1.1      0          100          0          mE
   AS_PATH: 65200 65100
5  10.55.55.0/24  18.1.1.1      0          100          0          mE
   AS_PATH: 65200 65100
6  10.55.55.0/24  22.1.1.1      0          100          0          mE
   AS_PATH: 65200 65100
7  10.55.55.0/24  23.1.1.1      0          100          0          mE
   AS_PATH: 65200 65100
8  10.55.55.0/24  20.1.1.1      0          100          0          mE
   AS_PATH: 65200 65100
Last update to IP routing table: 0h28m14s      Route is advertised to 7 peers:
17.1.1.1(65200)                                18.1.1.1(65200)
19.1.1.1(65200)                                20.1.1.1(65200)
20.1.1.1(65200)                                21.1.1.1(65200)
22.1.1.1(65200)
23.1.1.1(65200)
```

show ip bgp routes

This example shows sample input from the **show ip bgp routes summary** command.

```
device# show ip bgp routes summary

Total number of BGP routes (NLRIs) Installed      : 1
Distinct BGP destination networks                 : 1
Filtered bgp routes for soft reconfig            : 0
Routes originated by this router                  : 1
Routes selected as BEST routes                   : 1
Routes Installed as BEST routes                   : 1
BEST routes not installed in IP forwarding table  : 0
Unreachable routes (no IGP route for NEXTHOP)    : 0
IBGP routes selected as best routes              : 0
EBGP routes selected as best routes              : 0
BEST routes not valid for IP forwarding table    : 0
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ip bgp routes community

Displays BGP4 route information that is filtered by community and other options.

## Syntax

```
show ip bgp routes community { num | internet | local-as | no-advertise | no-export } [ vrf vrf-name ]
```

## Parameters

### community

Displays routes filtered by a variety of communities.

### *num*

Specific community member.

### internet

Displays routes for the Internet community.

### local-as

Displays routes for a local sub-AS within the confederation.

### no-advertise

Displays routes with this community that cannot be advertised to any other BGP4 devices at all.

### no-export

Displays routes for the community of sub-ASs within a confederation.

### vrf *vrf-name*

Specifies a VRF instance.

## Modes

Privileged EXEC mode

## Examples

The following example shows output from the **show ip bgp routes community** command when the **internet** keyword is used.

```
device# show ip bgp routes community internet
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ip bgp summary

Displays BGP information such as the local autonomous system number (ASN), maximum number of routes supported, and some BGP4 statistics.

## Syntax

```
show ip bgp summary [ vrf vrf-name ]
```

## Parameters

**vrf vrf-name**  
Specifies a VRF instance.

## Modes

Privileged EXEC mode

## Examples

This example displays summary BGP information.

```
device# show ip bgp summary

BGP4 Summary
Router ID: 4.4.4.4   Local AS Number: 65300
Confederation Identifier: not configured
Confederation Peers:
Maximum Number of IP ECMP Paths Supported for Load Sharing: 2
Number of Neighbors Configured: 8, UP: 8
Number of Routes Installed: 80088, Uses 7688448 bytes
Number of Routes Advertising to All Neighbors: 70077 (10011 entries), Uses 600660 bytes
Number of Attribute Entries Installed: 16, Uses 1664 bytes
Neighbor Address  AS#           State      Time      Rt:Accepted  Filtered  Sent      ToSend
16.1.1.1          65200         ESTAB     2h26m 8s  10011       0         1         0
17.1.1.1          65200         ESTAB     2h26m 8s  10011       0        10010     0
18.1.1.1          65200         ESTAB     2h26m 7s  10011       0        10011     0
19.1.1.1          65200         ESTAB     2h26m 7s  10011       0        10011     0
20.1.1.1          65200         ESTAB     2h26m 7s  10011       0        10011     0
21.1.1.1          65200         ESTAB     2h26m 7s  10011       0        10011     0
22.1.1.1          65200         ESTAB     2h26m 2s  10011       0        10011     0
23.1.1.1          65200         ESTAB     2h26m 7s  10011       0        10011     0
...
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ip dhcp relay address interface

Displays IP DHCP relay addresses configured on supported interfaces.

## Syntax

```
show ip dhcp relay address interface [ ethernet slot/port | ve interface number ]
```

## Parameters

**ethernet** slot/port

Interface name in slot/port format.

**ve** interface number

Interface name in slot/port format.

## Modes

Privileged EXEC mode

## Examples

The following example displays DHCP relay address(es) configured on interface 1/4:

```
device# show ip dhcp relay address interface ethernet 1/4
-----
Interface                Relay Address                VRF Name
-----
Eth 1/4                   10.3.4.5                      blue
Eth 1/4                   10.5.1.1                      default-vrf
```

The following example displays DHCP relay address(es) configured on Ve 300:

```
device# show ip dhcp rel add int ve 300
-----
Interface                Relay Address                VRF Name
-----
Ve 300                   10.0.1.2                      default-vrf
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ip dhcp relay gateway

Displays IP DHCP Relay gateway addresses.

## Syntax

```
show ip dhcp relay gateway [interface [ ethernet slot/port | Ve number ]]
```

## Parameters

*interface*

The interface ethernet slot/port number or the Ve number.

## Modes

Privileged EXEC mode

## Usage Guidelines

Use this command to display the gateway address configured on the switch or on the interface.

## Examples

To display the gateway address configured on the switch:

```
device# show ip dhcp relay gateway
-----
Interface                Gateway Address
-----
Eth 3/5                  10.1.1.1
Ve 100                   100.1.1.1
```

To display the gateway address configured on the interface:

```
device# show ip dhcp relay gateway interface ethernet 3/5
-----
Interface                Gateway Address
-----
Eth 3/5                  10.1.1.1
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# show ip dhcp relay statistics

Displays the general information about the DHCP Relay function.

## Syntax

```
show ip dhcp relay statistics
```

## Modes

Privileged EXEC mode

## Usage Guidelines

The **show ip dhcp relay statistics** command displays the following information about the IP DHCP Relay function for IP DHCP Relay addresses configured on the switch:

- DHCP Server IP Address configured in the switch.
- Number of DHCP DISCOVERY, OFFER, REQUEST, ACK, NAK, DECLINE, and RELEASE packets received.
- Number of DHCP client packets received (on port 67) and relayed by the Relay Agent.
- Number of DHCP server packets received (on port 67) and relayed by the Relay Agent.

DHCP unicast packets are forwarded directly per route. These packets are not trapped to the management module. As a result, the DHCP renewal Request/ACK and DHCP Release packets are not be counted toward statistics.

## Examples

To display general information about the DHCP relay function:

```
device# show ip dhcp relay statistics
DHCP Relay Statistics:
-----
Address          Disc.      Offer      Req.       Ack        Nak        Decline    Inform
-----
10.1.0.1         400        100        2972       2968       0          0          0
20.2.0.1         400        100        2979       2975       0          0          0
30.3.0.1         400        100        3003       2998       0          0          0
40.4.0.1         400        100        3026       3018       0          0          0

Client Packets: 12780
Server Packets: 12359
Client Packets Dropped: 0
Server Packets Dropped: 0
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ip igmp groups

Displays information related to learned groups in the IGMP protocol module.

## Syntax

```
show ip igmp groups [ detail | interface | vlan vlan_id ]
```

## Parameters

### detail

Displays detailed information.

### interface

Specifies an interface type.

### vlan *vlan\_id*

Specifies a VLAN interface.

## Modes

Privileged EXEC mode

## Usage Guidelines

Use this command to display the IGMP database, including configured entries for either all groups on all interfaces, or all groups on specific interfaces, or specific groups on specific interfaces.

## Examples

The following example displays the IP IGMP groups.

```
device# show ip igmp groups
Total Number of Groups: 2
IGMP Connected Group Membership
Group Address  Interface Uptime      Expires      Last Reporter  Version
225.1.1.1      vlan25   00:05:27     00:02:32     25.1.1.1202
Member Ports: eth 2/24
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ip igmp interface

Displays Layer 3 IGMP interface configuration information.

## Syntax

```
show ip igmp interface [ ethernet slot/port | port-channel | Ve ]
```

## Modes

Privileged EXEC mode

## Examples

The following example displays IGMP protocol information for port-channel 1.

```
device# show ip igmp interface port-channel 1
Interface po1
IGMP disabled
```

The following example displays the output for the **show ip igmp interface** command.

```
device# show ip igmp interface
Interface Ve100
IGMP enabled
IGMP query interval 30 seconds
IGMP other-querierinterval 65 seconds
IGMP query response time 10 seconds
IGMP last-member query interval 1 seconds
IGMP immediate-leave disabled
IGMP querier100.0.0.1(this system)
IGMP version 2
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ip igmp snooping

Displays IGMP snooping information.

## Syntax

```
show ip igmp snooping [mrouter vlan vlan_id | vlan vlan_id]
```

## Parameters

**mrouter vlan** *vlan\_id*

Specifies which VLAN interface to display the mrouter configuration related information.

**vlan** *vlan\_id*

Specifies which VLAN interface to display the snooping configuration related information.

## Modes

Privileged EXEC mode

## Usage Guidelines

Use the **show ip igmp snooping** command to display IGMP snooping information, display multicast router port related information for the specified VLAN, or to display snooping statistics for the specified VLAN in the IGMP protocol module.

## Examples

The following example displays IGMP snooping information.

```
device# show ip igmp snooping vlan 45
Vlan ID: 45
Multicast Router ports:  eth3/2
Querier - Enabled,
IGMP Operation mode: IGMPv2
Is Fast-Leave Enabled : Disabled
Max Response time = 10
Last Member Query Interval = 1
Query interval = 125
Number of Multicast Groups: 1
Group: 225.0.0.1
Member Ports:  eth4/22 eth6/15
Mapped MAC address: 0100.5e00.0001
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ip igmp ssm-map

Displays the association between a configured prefix list and source address mapped to it.

## Syntax

```
show ip igmp ssm-map
```

## Modes

Privileged EXEC mode

## Usage Guidelines

## Command Output

The **show ip igmp ssm-map** command displays the following information:

Output field	Description
PrefixList Name	The name assigned to the prefix list.
Source Address	The source address IP.

## Examples

The following example shows the association between a configured prefix list and source address mapped to it.

```
device# show ip igmp ssm-map
```

```
+-----+-----+
| PrefixList Name | Source Address |
+-----+-----+
| ssm-map-230-to-232 | 203.0.0.10 |
| ssm-map-233-to-234 | 204.0.0.11 |
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ip igmp statistics interface

Displays IGMP statistics for an interface.

## Syntax

```
show ip igmp statistics interface [ ethernet slot/port | port-channel | ve ve interface ID ]
```

## Parameters

**ethernet** slot/port

Represents an Ethernet interface name in slot/port format.

**port-channel** number

Specifies a port-channel interface. The range is from 1 through 64.

**ve** Ve interface number

Specifies a virtual Ethernet (VE) interface number. The range is 1 - 4096.

## Modes

Privileged EXEC mode

## Examples

The following example displays the output of the **show ip igmp statistics interface** command.

```
device# show ip igmp statistics interface ve100
IGMP packet statistics for ve100:
IGMP Message type      Edge-Received  Edge-Sent  Edge-Rx-Errors
Membership Query        0             229        0
V1 Membership Report    0             0          0
V2 Membership Report    0             0          0
Group Leave             0             0          0
V3 Membership Report    0             0          0
PIM hello               456           0          0

IGMP Error Statistics:
Unknown types           0
Bad Length              0
Bad Checksum            0
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ip igmp statistics vlan

Displays information for a specific VLAN.

## Syntax

```
show ip igmp statistics vlan vlan-id
```

## Parameters

*vlan-id*

Specifies the VLAN-ID. The range is 1 through 4090.

## Modes

Privileged EXEC mode

## Examples

The following example displays the IP IGMP statistics on VLAN 1.

```
device# show ip igmp statistics interface vlan 1

IGMP packet statistics for all interfaces in vlan 1:
IGMP Message type      Edge-Received   Edge-Sent   Edge-Rx-Errors   ISL Received
Membership Query        0                0           0                 0
V1 Membership Report    0                0           0                 0
V2 Membership Report    0                0           0                 0
Group Leave             0                0           0                 0
V3 Membership Report    0                0           0                 0
PIM hello               0                0           0                 0

IGMP Error Statistics:
Unknown types           0
Bad Length              0
Bad Checksum            0
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ip interface

Displays the IP address, status, and configuration for a specified interface.

## Syntax

```
show ip interface { brief | ethernet slot/port }
```

## Parameters

### brief

Specifies a brief summary of IP interface status and configuration.

### ethernet slot/port

Specifies an Ethernet slot and port.

## Modes

Privileged EXEC mode

## Usage Guidelines

You can also display a brief summary of such information for all interfaces.

## Examples

The following example displays information about all of the interfaces in the summary format.

```
device# show ip interface brief
Interface          IP-Address      Vrf              Status
Protocol
=====
Port-channel 1     unassigned
Port-channel 2     unassigned
Ethernet 1/1       unassigned      default-vrf      up
down (UDLD blocked unidirectional link)
Ethernet 1/2       unassigned      default-vrf      up
down (Link-OAM blocked link)
Ethernet 1/3       unassigned      default-vrf      up
Ethernet 1/4       unassigned      default-vrf      administratively down  down  up
```



The following example displays the IP interface status of a specified Ethernet port.

```
device# show ip interface ethernet 1/1
Ethernet 1/2 is up, line protocol is down (Link-OAM blocked link), Link-OAM is enabled
Hardware is Ethernet, address is 00e0.0c70.c005
  Current address is 00e0.0c70.c005
Pluggable media present
Interface index (ifindex) is 406880257
MTU 1548 bytes
10G Interface
LineSpeed Actual      : Nil
LineSpeed Configured : Auto, Duplex: Full
Priority Tag disable
Last clearing of show interface counters: 10:50:20
Queueing strategy: fifo
Receive Statistics:
  67181801 packets, 8867997496 bytes
  Unicasts: 67181799, Multicasts: 1, Broadcasts: 1
  64-byte pkts: 1, Over 64-byte pkts: 4, Over 127-byte pkts: 67181796
  Over 255-byte pkts: 0, Over 511-byte pkts: 0, Over 1023-byte pkts: 0
  Over 1518-byte pkts(Jumbo): 0
  Runts: 0, Jabbers: 0, CRC: 0, Overruns: 0
  Errors: 0, Discards: 0
Transmit Statistics:
  82627975 packets, 10906817712 bytes
  Unicasts: 82627873, Multicasts: 11, Broadcasts: 89
  Underruns: 0
  Errors: 0, Discards: 0
Rate info:
  Input 0.000000 Mbits/sec, 0 packets/sec, 0.00% of line-rate
  Output 0.001014 Mbits/sec, 1 packets/sec, 0.00% of line-rate
Time since last interface status change: 00:08:22
```

## History

Release version	Command history
16r.1.00	This command was introduced.
17r.1.01	This command was modified to reflect Link OAM.

# show ip multicast snooping

Displays IP multicast snooping configuration information.

## Syntax

```
show ip multicast snooping [ mcachevlan interface | vlan vlan-id ]
```

## Parameters

### mcache

Specifies the multicast cache entries.

### vlan interface

Specifies which VLAN's snooping mcache entries should be displayed.

### vlan

Specifies the VLAN.

### vlan-id

Specifies the VLAN-ID.

## Modes

User EXEC mode

## Examples

The following example displays the output for the **show ip multicast snooping mcache** command.

```
device# show ip multicast snooping mcache
Flags : V2|V3 : IGMP Receiver, P_G : PIM (*,G) Join, P_SG: PIM (S,G) Join
VlanID : 25
-----
1 (*, 225.1.1.1 ) 00:02:15 NumOIF: 1
Outgoing Ports:
eth2/24          Flags: 0x14 ( V2)  00:02:15/126s
```

The following output displays v3 flag for entries learned through the IGMPv3 report.

```
device# show ip multicast snooping mca
Flags : V2|V3 : IGMP Receiver, P_G : PIM (*,G) Join, P_SG: PIM (S,G) Join
          BR : PIM Blocked RPT
Vlan ID : 10
-----
1      (20.20.20.20, 232.0.0.10 ) 22:37:48   NumOIF: 1
Outgoing Ports:
eth1/34          Flags: 0x24 ( V3)  00:00:08/252s
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ip ospf

Displays OSPF information.

## Syntax

```
show ip ospf [ vrf name ]
```

## Parameters

**vrf name**

Specifies the name of the VRF instance. If this option is not used, details for the default VRF are shown in the output.

## Modes

Privileged EXEC mode

## Examples

The following example shows sample output from the **show ip ospf** command.

```
device# show ip ospf
OSPF Version                Version 2
Router Id                   10.0.0.4
ASBR Status                 No
ABR Status                  No          (0)
Redistribute Ext Routes from
Initial SPF schedule delay  0          (msecs)
Minimum hold time for SPF  0          (msecs)
Maximum hold time for SPF  0          (msecs)
External LSA Counter       0
External LSA Checksum Sum  0
Originate New LSA Counter  0
Rx New LSA Counter         0
External LSA Limit         14913080
Administrative Distance
- External Routes:         110
- Intra Area Routes:      110
- Inter Area Routes:      110
Database Overflow Interval  0
Database Overflow State :  NOT OVERFLOWED
RFC 1583 Compatibility :   Disabled
NSSA Translator:           Enabled
Nonstop Routing:           Disabled
Graceful Restart           Enabled
Graceful Restart Helper    Enabled
Graceful Restart Time      120
LDP-SYNC: Not globally enabled
Interfaces with LDP-SYNC enabled:
None
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ip ospf area

Displays the OSPF area table in a specified format.

## Syntax

```
show ip ospf area { A.B.C.D | decimal } database link-state [ adv-router router-id | advertise index | asbr { asbr-id | adv-router router-id } | extensive | link-state-id id | network { net-id | adv-router router-id } | nssa { nssa-id | adv-router router-id } | router { router-id | adv-router router-id } | self-originate | sequence-number num | summary { id | adv-router router-id } ] [ vrf vrfname ]
```

```
show ip ospf area [ vrf vrfname ]
```

## Parameters

*A.B.C.D*

Area address in dotted decimal format.

*decimal*

Area address in decimal format. Valid values range from 0 to 2147483647.

**database link-state**

Displays database link-state information.

**adv-router** *router-id*

Displays the link state for the advertising router that you specify.

**advertise** *index*

Displays the link state by Link State Advertisement (LSA) index.

**asbr**

Displays the link state for all autonomous system boundary router (ASBR) links.

*asbr-id*

Displays the state of a single ASBR link that you specify.

**extensive**

Displays detailed information for all entries in the OSPF database.

**link-state-id** *id*

Displays the link state by link-state ID.

**network**

Displays the link state by network link.

*net-id*

Displays the link state of a particular network link that you specify.

**nssa**

Displays the link state by not-so-stubby area (NSSA).

*nssa-id*

Displays the link state of a particular NSAA area that you specify.

**router**

Displays the link state by router link.

*router-id*

Displays the link state of a particular router link that you specify.

**self-originate**

Displays self-originated link states.

**sequence-number *num***

Displays the link-state by sequence number that you specify.

**summary**

Displays the link state summary. Can specify link-state ID or advertising router ID.

*id*

Displays the link state for the advertising router that you specify.

**vrf vrf *name***

Specifies the name of the VRF instance. If this option is not used, details for the default VRF are shown in the output.

## Modes

Privileged EXEC mode

## Examples

The following example shows output for the **show ip ospf area** command.

device# show ip ospf area

Number of Areas is 1

Index	Area	Type	Cost	SPFR	ABR	ASBR	LSA	Checksum (Hex)
1	0	normal	0	4305	0	0	5	00024f5a

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ip ospf border-routers

Displays information about border routers and boundary routers.

## Syntax

```
show ip ospf border-routers [ A.B.C.D ] [ vrf vrfname ]
```

## Parameters

*A.B.C.D*

Specifies the router ID in dotted decimal format.

vrf *vrf name*

Specifies the name of the VRF instance. If this option is not used, details for the default VRF are shown in the output.

## Modes

Privileged EXEC mode

## Usage Guidelines

Use this command to display information about area border routers (ABRs) and autonomous system boundary routers (ASBRs). You can display information for all ABRs and ASBRs or for a specific router.

## Examples

The following example displays information for all ABRs and ASBRs:

```
device# show ip ospf border-routers
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ip ospf config

Displays OSPF information.

## Syntax

```
show ip ospf config [ vrf name ]
```

## Parameters

**vrf name**

Specifies the name of the VRF instance. If this option is not used, details for the default VRF are shown in the output.

## Modes

Privileged EXEC mode

## Examples

The following example shows sample output from the show ip ospf config command.

```
device# show ip ospf config

Router OSPF: Enabled
Nonstop Routing: Disabled
Graceful Restart: Enabled
Graceful Restart Helper: Enabled
Graceful Restart Time: 120

Redistribution: Disabled
Default OSPF Metric: 10
Maximum Paths: 8
OSPF Auto-cost Reference Bandwidth: Disabled
Default Passive Interface: Disabled
OSPF Redistribution Metric: Type2
OSPF External LSA Limit: 14913080
OSPF Database Overflow Interval: 0
RFC 1583 Compatibility: Disabled
VRF Lite capability: Disabled
Router id: 10.0.0.4
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ip ospf database

Shows OSPFv2 database information.

## Syntax

```
show ip ospf database database-summary [ vrf vrfname ]
show ip ospf database external-link-state [ advertise index | extensive | link-state-id id | router-id router-id | sequence-number num ] [ vrf vrfname ]
show ip ospf database grace-link-state [ vrf vrfname ]
show ip ospf database link-state [ adv-router router-id | advertise index | asbr { asbr-id | adv-router router-id } | extensive | link-state-id id | network { net-id | adv-router router-id } | nssa { nssa-id | adv-router router-id } | router { router-id | adv-router router-id } | self-originate | sequence-number num | summary { id | adv-router router-id } ] [ vrf vrfname ]
show ip ospf database [ vrf vrfname ]
```

## Parameters

### database-summary

Displays how many link state advertisements (LSAs) of each type exist for each area, as well as total number of LSAs.

### vrf name

Specifies the name of the VRF instance. If this option is not used, details for the default VRF are shown in the output.

### external-link-state

Displays information by external link state, based on the following parameters:

#### advertise index

Displays the hexadecimal data in the specified LSA packet. The *index* parameter identifies the LSA packet by its position in the router's External LSA table. To determine an LSA packet's position in the table, enter the **show ip ospf external-link-state** command.

#### extensive

Displays LSAs in decrypt format. Do not use this parameter in combination with other display parameters because the entire database is displayed.

#### link-state-id id

Displays external LSAs for the LSA source that you specify.

#### router-id router-id

Displays external LSAs for the advertising router that you specify.

#### sequence-number num

Displays the External LSA entries for the hexadecimal LSA sequence number that you specify.

### link-state

Displays the link state, based on the following parameters:

#### adv-router router-id

Displays the link state for the advertising router that you specify.



**advertise** *index*

Displays the hexadecimal data in the specified LSA packet. The *index* parameter identifies the LSA packet by its position in the router's external-LSA table. To determine an LSA packet's position in the table, enter the **show ip ospf external-link-state** command.

**asbr**

Displays autonomous system boundary router (ASBR) LSAs.

**extensive**

Displays LSAs in decrypt format. Do not use this parameter in combination with other display parameters because the entire database is displayed.

**link-state-id** *id*

Displays LSAs for the LSA source that you specify.

**network**

Displays either all network LSAs or the LSAs for a network that you specify.

**nssa**

Displays either all NSSA LSAs or the LSAs for a not-so-stubby area (NSSA) that you specify.

**router**

Displays LSAs by router link.

**router-id** *router-id*

Displays LSAs for the advertising router that you specify.

**self-originate**

Displays self-originated LSAs.

**sequence-number**

Displays the LSA entries for the hexadecimal LSA sequence number that you specify.

**summary**

Displays summary information. You can specify link-state ID or advertising router ID.

**adv-router** *router-id*

Displays the link state for the advertising router that you specify.

## Modes

Privileged EXEC mode

## Examples

The following example shows output for the **show ip ospf database** command.

```
device# show ip ospf database
```

```
Link States
```

Index	Area ID	Type	LS ID	Adv Rtr	Seq (Hex)	Age	Cksum
1	0	Rtr	200.1.2.3	200.1.2.3	0x80000bb8	235	0x6a51
2	0	Rtr	20.20.20.20	20.20.20.20	0x80000088	1680	0xcb6a
3	0	Rtr	54.1.1.1	54.1.1.1	0x8000009f	599	0x6c3d
4	0	Net	53.1.1.1	200.1.2.3	0x80000006	235	0xd22
5	0	Net	53.54.43.53	200.1.2.3	0x8000007e	626	0x53e6

show ip ospf database

The following example shows output for the **show ip ospf database** command when the **database-summary** keyword is used.

```
device# show ip ospf database database-summary
```

Area ID	Router	Network	Sum-Net	Sum-ASBR	NSSA-Ext	Opg-Area	Subtotal
0	3	2	0	0	0	0	5
AS External							0
Total	3	2	0	0	0	0	5

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ip ospf filtered-lsa area

Displays information about type3 LSA filters attached to specified OSPFv2 areas and lists LSAs filtered in or out.

## Syntax

```
show ip ospf filtered-lsa area { ip-address | decimal } { in | out } [ vrf vrf-name ]
```

## Parameters

*ip-address*

Specifies the IP address of an area.

*decimal*

Specifies an area address in decimal format. Valid values range from 0 through 2147483647.

**in**

Specifies the incoming direction.

**out**

Specifies the outgoing direction.

**vrf** *vrf-name*

Specifies the name of the VRF instance.

## Modes

Privileged EXEC mode

## Examples

The following example displays information about type 3 LSA filtering in the out direction for OSPFv2 area 0.

```
device# show ip ospf filtered-lsa area 0 out
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ip ospf interface

Displays information about all or specific OSPF-enabled interfaces.

## Syntax

```
show ip ospf interface [ A.B.C.D | brief ] [ vrf vrf-name ]
```

```
show ip ospf interface [ ethernet slot/port | loopback number | ve vlan_id ] [ brief ] [ vrf vrf-name ]
```

```
show ip ospf interface [ vrf vrf-name ]
```

## Parameters

*A.B.C.D*

Specifies interface IP address in dotted decimal format.

**brief**

Displays summary information.

**vrf** *vrf-name*

Specifies the name of the VRF instance. If this option is not used, details for the default VRF are shown in the output.

**ethernet** *slot/port*

Specifies an Ethernet slot and port.

**loopback** *number*

Specifies a loopback port number. Valid values range from 1 through 255.

**ve** *vlan\_id*

Specifies a virtual Ethernet (VE) interface. Valid values range from 1 through 4096

## Modes

Privileged EXEC mode

## Examples

The following example displays OSPF information about all enabled interfaces.

```
device# show ip ospf interface

Ethernet 1/2 admin up, oper up
  IP Address 53.1.1.36, Area 0
  BFD is disabled
  Database Filter: Not Configured
  State BDR, Pri 1, Cost 1, Options -----E-, Type broadcast Events 3
  Timers(sec): Transmit 1, Retrans 5, Hello 10, Dead 40
  DR: Router ID 200.1.2.3      Interface Address 53.1.1.1
  BDR: Router ID 20.20.20.20   Interface Address 53.1.1.36
  Neighbor Count = 1, Adjacent Neighbor Count= 1
  Neighbor:      53.1.1.1 [id 200.1.2.3] (DR)
  Authentication-Key: None
  MD5 Authentication: Key None, Key-Id None , Auth-change-wait-time 300
  LDP-SYNC: Disabled, State: -

Loopback 1 admin up, oper up
  IP Address 20.20.20.20, Area 0
  BFD is disabled
  Database Filter: Not Configured
  State DR, Pri 1, Cost 1, Options -----E-, Type broadcast Events 2
  Timers(sec): Transmit 1, Retrans 5, Hello 10, Dead 40
  DR: Router ID 20.20.20.20   Interface Address 20.20.20.20
  BDR: Router ID 0.0.0.0      Interface Address 0.0.0.0
  Neighbor Count = 0, Adjacent Neighbor Count= 0
  Authentication-Key: None
  MD5 Authentication: Key None, Key-Id None , Auth-change-wait-time 300
  LDP-SYNC: Disabled, State: -
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ip ospf neighbor

Displays OSPF neighbor information.

## Syntax

```
show ip ospf neighbor [ extensive ] [ ethernet slot/port | router-id A.B.C.D | ve vlan_id ] [ vrf vrf-name ]
show ip ospf neighbor [ vrf vrf-name ]
```

## Parameters

### extensive

Displays detailed neighbor information.

### ethernet slot/port

Specifies an Ethernet slot and port.

### router-id A.B.C.D

Displays neighbor information for the specified router ID (in dotted decimal format).

### ve vlan\_id

Specifies a virtual Ethernet (VE) interface. Valid values range from 1 through 4096.

### vrf vrf-name

Specifies the name of the VRF instance. If this option is not used, details for the default VRF instance are shown in the output.

## Modes

Privileged EXEC mode

## Examples

The following example displays information about OSPF neighbors.

```
device# show ip ospf neighbor
```

```
Number of Neighbors is 1, in FULL state 1
```

Port	Address	Pri	State	Neigh Address	Neigh ID	Ev	Opt	Cnt
Eth 1/2	53.1.1.36	1	FULL/DR	53.1.1.1	200.1.2.3	6	66	0

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ip ospf redistribute route

Displays routes that have been redistributed into OSPF.

## Syntax

```
show ip ospf redistribute route [ A.B.C.D:M ] [ vrf vrfname ]
```

## Parameters

*A.B.C.D:M*

Specifies an IP address and mask for the output.

*vrf vrfname*

Specifies the name of the VRF instance. If this option is not used, details for the default VRF are shown in the output.

## Modes

Privileged EXEC mode

## Examples

The following example shows sample output for the **show ip ospf redistribute route** command.

```
device# show ip ospf redistribute route
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ip ospf routes

Displays OSPF calculated routes.

## Syntax

```
show ip ospf routes [ A.B.C.D ] [ vrf vrfname ]
```

## Parameters

*A.B.C.D*

Specifies a destination IP address in dotted decimal format.

vrf *vrfname*

Specifies the name of the VRF instance.

## Modes

Privileged EXEC mode

## Usage Guidelines

Use this command to display routes that OSPF calculated. You can display all routes or you can display information about a specific route.



## Examples

The following example displays all OSPF-calculated routes.

```
device# show ip ospf routes
```

OSPF Regular Routes 7:

```

Destination      Mask           Path_Cost  Type2_Cost Path_Type
1.1.1.1          255.255.255.255 1          0          Intra
Adv_Router      Link_State    Dest_Type  State      Tag        Flags
1.1.1.1        1.1.1.1      Network    Valid      0          6
Paths Out_Port  Next_Hop     Type       State
1   Lo 1        0.0.0.0     OSPF      0 0

Destination      Mask           Path_Cost  Type2_Cost Path_Type
1.1.1.2          255.255.255.255 1          0          Intra
Adv_Router      Link_State    Dest_Type  State      Tag        Flags
1.1.1.1        1.1.1.1      Network    Valid      0          6
Paths Out_Port  Next_Hop     Type       State
1   Lo 2        0.0.0.0     OSPF      0 0

Destination      Mask           Path_Cost  Type2_Cost Path_Type
1.1.1.3          255.255.255.255 1          0          Intra
Adv_Router      Link_State    Dest_Type  State      Tag        Flags
1.1.1.1        1.1.1.1      Network    Valid      0          6
Paths Out_Port  Next_Hop     Type       State
1   Lo 3        0.0.0.0     OSPF      0 0

Destination      Mask           Path_Cost  Type2_Cost Path_Type
1.1.1.4          255.255.255.255 1          0          Intra
Adv_Router      Link_State    Dest_Type  State      Tag        Flags
1.1.1.1        1.1.1.1      Network    Valid      0          6
Paths Out_Port  Next_Hop     Type       State
1   Lo 4        0.0.0.0     OSPF      0 0

Destination      Mask           Path_Cost  Type2_Cost Path_Type
1.1.1.5          255.255.255.255 1          0          Intra
Adv_Router      Link_State    Dest_Type  State      Tag        Flags
1.1.1.1        1.1.1.1      Network    Valid      0          6
Paths Out_Port  Next_Hop     Type       State
1   Lo 5        0.0.0.0     OSPF      0 0

Destination      Mask           Path_Cost  Type2_Cost Path_Type
1.1.1.6          255.255.255.255 1          0          Intra
Adv_Router      Link_State    Dest_Type  State      Tag        Flags
1.1.1.1        1.1.1.1      Network    Valid      0          6
Paths Out_Port  Next_Hop     Type       State
1   Lo 6        0.0.0.0     OSPF      0 0

Destination      Mask           Path_Cost  Type2_Cost Path_Type
1.1.1.7          255.255.255.255 1          0          Intra
Adv_Router      Link_State    Dest_Type  State      Tag        Flags
1.1.1.1        1.1.1.1      Network    Valid      0          6
Paths Out_Port  Next_Hop     Type       State
1   Lo 7        0.0.0.0     OSPF      0 0

```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ip ospf summary

Displays summary information for all OSPF instances.

## Syntax

```
show ip ospf summary [ vrf vrfname ]
```

## Parameters

*vrf vrfname*

Specifies the name of the VRF instance. If this option is not used, details for the default VRF are shown in the output.

## Modes

Privileged EXEC mode

## Examples

```
device# show ip ospf summary
```

Seq	Instance	Intfs	Nbrs	Nbrs-Full	LSAs	Routes
1	default-vrf	5	2	1	12	2

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ip ospf traffic

Displays OSPF traffic details.

## Syntax

```
show ip ospf traffic
```

```
show ip ospf traffic [ ethernet slot/port | loopback number | ve vlan_id] [ vrf vrf-name ]
```

## Parameters

### interface

Specifies an interface.

### ethernet *slot / port*

Specifies an Ethernet slot and port.

### loopback *number*

Specifies a loopback interface. Valid values range from 1 through 255.

### ve *vlan\_id*

Specifies a virtual Ethernet (VE) interface. Valid values range from 1 through 4096.

### vrf *vrf-name*

Specifies the name of the VRF instance.

## Modes

Privileged EXEC mode

## Usage Guidelines

Use this command to display details of OSPF traffic sent and received. You can display all traffic or specify a particular interface.

## Examples

The following example shows all OSPF traffic.

```
device# show ip ospf traffic

                Packets Received          Packets Sent
Hello                10                    10
Database             90                    89
LSA Req              12                    11
LSA Upd              12                    12
LSA Ack              12                    12
No Packet Errors!
```

show ip ospf traffic

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ip ospf virtual link

Displays information about virtual links.

## Syntax

```
show ip ospf virtual link [ index ] [ vrf vrfname ]
```

## Parameters

*index*

Shows information about all virtual links or one virtual link that you specify.

**vrf** *vrfname*

Specifies the name of the VRF instance. If this option is not used, details for the default VRF are shown in the output.

## Modes

Privileged EXEC mode

## Examples

The following example shows information about all virtual links.

```
device# show ip ospf virtual link
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ip ospf virtual neighbor

Displays information about virtual neighbors.

## Syntax

```
show ip ospf virtual neighbor [ index ] [ vrf vrfname ]
```

## Parameters

*index*

Shows information about all virtual neighbors or one virtual neighbor that you specify.

**vrf** *vrfname*

Specifies the name of the VRF instance. If this option is not used, details for the default VRF are shown in the output.

## Modes

Privileged EXEC mode

## Examples

The following example shows information about all virtual neighbors:

```
device# show ip ospf virtual neighbor
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ip pim bsr

Displays bootstrap router (BSR) information.

## Syntax

```
show ip pim [ all-vrf | vrf vrf-name ] bsr
```

## Parameters

### all-vrf

Displays information for all VRFs.

### vrf vrf-name

Displays information for a specific VRF instance.

### bsr

Displays BSR information.

## Modes

User EXEC mode

## Usage Guidelines

When entered without the **vrf** option, this command displays information for the default VRF instance.

## Command Output

The **show ip pim bsr** command displays the following information:

Output Field.	Description
BSR address	The IP address of the interface configured as the PIM Sparse BSR.
BSR priority	The priority assigned to the interface for use during the BSR election process. During BSR election, the priorities of the candidate BSRs are compared and the interface with the highest BSR priority becomes the BSR.
Hash mask length	The number of significant bits in the IP multicast group comparison mask. This mask determines the IP multicast group numbers for which the device can be a BSR. The default is 32 bits, which allows the device to be a BSR for any valid IP multicast group number.  <b>NOTE</b> This field appears only if this device is a candidate BSR.
Next bootstrap message in	Indicates how much time will pass before the BSR sends the next bootstrap message. The time is displayed in "hh:mm:ss" format.

Output Field.	Description
	<p><b>NOTE</b> This field appears only if this device is the BSR.</p>
Next Candidate-RP-advertisement message in	<p>Indicates how much time will pass before the BSR sends the next candidate PR advertisement message. The time is displayed in "hh:mm:ss" format.</p> <p><b>NOTE</b> This field appears only if this device is a candidate BSR.</p>
RP	<p>Indicates the IP address of the Rendezvous Point (RP).</p> <p><b>NOTE</b> This field appears only if this device is a candidate BSR.</p>
group prefixes	<p>Indicates the multicast groups for which the RP listed by the previous field is a candidate RP.</p> <p><b>NOTE</b> This field appears only if this device is a candidate BSR.</p>
Candidate-RP-advertisement period	<p>Indicates how frequently the BSR sends candidate RP advertisement messages.</p> <p><b>NOTE</b> This field appears only if this device is a candidate BSR.</p>

## Examples

The following example shows information for a device that has been elected as the BSR.

```
device> show ip pim bsr
PIMv2 Bootstrap information
-----
This system is the Elected BSR
BSR address: 1.51.51.1. Hash Mask Length 32. Priority 255.
Next bootstrap message in 00:01:00
Configuration:
  Candidate loopback 2 (Address 1.51.51.1). Hash Mask Length 32. Priority 255.
Next Candidate-RP-advertisement in 00:01:00
RP: 1.51.51.1
  group prefixes:
    224.0.0.0 / 4
Candidate-RP-advertisement period: 60
```

The following example shows information for a device that is not the BSR.

```
device(config)# show ip pim bsr
PIMv2 Bootstrap information
-----
BSR address: 1.51.51.1. Hash Mask Length 32. Priority 255.
Next Candidate-RP-advertisement in 00:00:30
RP: 1.51.51.3
  group prefixes:
    224.0.0.0 / 4
Candidate-RP-advertisement period: 60
```



## History

Release version	Command history
16r.1.00	This command was introduced.



# show ip pim mcache

Displays the multicast cache.

## Syntax

```
show ip pim mcache [ A.B.C.D | ecmp ipv4 address ]
```

## Parameters

*A.B.C.D*

Specifies the multicast group or source IP address.

*ecmp ipv4 address*

Specifies the PIM ECMP IPv4 information.

## Modes

Privileged EXEC mode

## Usage Guidelines

## Examples

The following example displays the output for **show ip pim mcache ip-address-1 ip-address-2**.

```
device# show ip pim mcache 50.1.1.101 230.1.1.1
IP Multicast Mcache Table
Entry Flags      : sm - Sparse Mode, ssm - Source Specific Multicast
                  RPT - RPT Bit, SPT - SPT Bit, LSrc - Local Source
                  LRcv - Local Receiver, RegProbe - Register In Progress
                  RegSupp - Register Suppression Timer, Reg - Register Complete
                  needRte - Route Required for Src/RP
Interface Flags: IM - Immediate, IH - Inherited, WA - Won Assert
                  MJ - Membership Join, BR - Blocked RPT, BA - Blocked Assert
                  BF - Blocked Filter
Total entries in mcache: 8
1 (50.1.1.101, 230.1.1.1) in Ve 40, Uptime 00:03:29
  Sparse Mode, RPT=0 SPT=1 Reg=0 RegSupp=0 RegProbe=0 LSrc=0 LRcv=1
  upstream neighbor=40.1.1.3
  num_oifs = 2
    Ve 2(00:03:29/181) Flags: IM
    Ve 10(00:03:29/0) Flags: MJ
Flags (0x400784d1)
  sm=1 ssm=0 needRte=0
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ip pim neighbor

Displays information about PIM neighbors.

## Syntax

```
show ip pim neighbor [ interface ethernet slot/port | interface ve ve-num ]
```

## Parameters

**interface ethernet** *slot/port*

Displays information for the specified Ethernet interface.

**interface ve** *ve-num*

Displays information for the specified VE interface.

## Modes

User EXEC mode

## Command Output

The **show ip pim neighbor** command displays the following information:

Output Field	Description
Port	The interface through which the device is connected to the neighbor.
Phyport	When there is a virtual interface, this is the physical port to which the neighbor is connected.
Neighbor	The IP interface of the PIM neighbor.
Holdtime sec	Indicates how many seconds the neighbor wants this device to hold the entry for this neighbor in memory. The neighbor sends the Hold Time in Hello packets: <ul style="list-style-type: none"> <li>If the device receives a new Hello packet before the Hold Time received in the previous packet expires, the device updates its table entry for the neighbor.</li> <li>If the device does not receive a new Hello packet from the neighbor before the Hold time expires, the device assumes the neighbor is no longer available and removes the entry for the neighbor.</li> </ul>
Age sec	The number of seconds since the device received the last hello message from the neighbor.
UpTime sec	The number of seconds the PIM neighbor has been up. This timer starts when the device receives the first Hello messages from the neighbor.
VRF	The VRF in which the interface is configured. This can be a VRF that the port was assigned to or the default VRF of the device.
Priority	The DR priority that is used in the DR election process. This can be a configured value or the default value of 1.

## Examples

The following example shows information about PIM neighbors.

```
device(config)# show ip pim neighbor
```

Port	PhyPort	Neighbor	Holdtime	T	PropDelay	Override	Age	UpTime	VRF	Prio
			sec	Bit	msec	msec	sec			
v2	e1/1	2.1.1.2	105	1	500	3000	0	00:44:10	default-vrf	1
v4	e1/2	4.1.1.2	105	1	500	3000	10	00:42:50	default-vrf	1
v5	e1/1	5.1.1.2	105	1	500	3000	0	00:44:00	default-vrf	1
v22	e1/1	22.1.1.1	105	1	500	3000	0	00:44:10	default-vrf	1

Total Number of Neighbors : 4

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ip pim rp-candidate

Displays candidate rendezvous point (RP) information.

## Syntax

```
show ip pim rp-candidate
```

## Parameters

**rp-candidate**

Specifies the candidate rendezvous point.

## Modes

User EXEC mode

## Usage Guidelines

When used without the **vrf** option, this command displays information for the default VRF.

## Command Output

The **show ip pim rp-candidate** command displays the following information:

Output Field	Description
Candidate-RP-advertisement in	How time will pass before the BSR sends the next RP message. The time is displayed in "hh:mm:ss" format.  <b>NOTE</b> This field appears only if this device is a candidate RP.
RP	The IP address of the RP.  <b>NOTE</b> This field appears only if this device is a candidate RP.
group prefixes	The multicast groups for which the RP listed by the previous field is a candidate RP.  <b>NOTE</b> This field appears only if this device is a candidate RP.
Candidate-RP-advertisement period	How frequently the BSR sends candidate RP advertisement messages.  <b>NOTE</b> This field appears only if this device is a candidate RP.

## Examples

The following example shows information for a candidate RP.

```
device> show ip pim rp-candidate
Next Candidate-RP-advertisement in 00:00:10
  RP: 207.95.7.1
    group prefixes:
      224.0.0.0 / 4
Candidate-RP-advertisement period: 60
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ip pim rp-hash

Displays rendezvous-point (RP) information for a PIM Sparse group.

## Syntax

```
show ip pim rp-hash group-addr
```

## Parameters

*group-addr*

Specifies the address of a PIM Sparse IP multicast group.

## Modes

Privileged EXEC mode

## Command Output

The **show ip pim rp-hash** command displays the following information:

Output Field	Description
RP	Indicates the IP address of the RP for the specified PIM Sparse group.
Info source	Indicates the source of the RP information. It can be a static-RP configuration or learned via the bootstrap router. If RP information is learned from the boot strap, the BSR IP address is also displayed.

## Examples

The following example shows RP information for a PIM Sparse group.

```
device# show ip pim rp-hash 239.255.162.1
RP: 207.95.7.1, v2
Info source: 207.95.7.1, via bootstrap
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# show ip pim rp-map

Displays rendezvous-point (RP)-to-group mapping information.

## Syntax

```
show ip pim rp-map
```

## Modes

User EXEC mode

## Command Output

The **show ip pim rp-map** command displays the following information:

Output Field	Description
Group address	Indicates the PIM Sparse multicast group address using the listed RP.
RP address	Indicates the IP address of the RP for the listed PIM Sparse group.

## Examples

The following example shows RP-to-group mapping.

```
device> show ip pim rp-map
Number of group-to-RP mappings: 6
Group address      RP address
-----
1 239.255.163.1   99.99.99.5
2 239.255.163.2   99.99.99.5
3 239.255.163.3   99.99.99.5
4 239.255.162.1   99.99.99.5
5 239.255.162.2   43.43.43.1
6 239.255.162.3   99.99.99.5
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ip pim rp-set

Displays rendezvous-point (RP)-set list for the device elected as the bootstrap router (BSR).

## Syntax

```
show ip pim rp-set
```

## Modes

User EXEC mode

## Command Output

The **show ip pim rp-set** command displays the following information:

Output Field	Description
Number of group prefixes	The number of PIM Sparse group prefixes for which the RP is responsible.
Group prefix	Indicates the multicast groups for which the RP listed by the previous field is a candidate RP.
RPs expected or received	Indicates how many RPs were expected and received in the latest bootstrap message.
RP num	Indicates the RP number. If there are multiple RPs in the PIM Sparse domain, a line of information for each RP is listed, in ascending numerical order.
priority	The RP priority of the candidate RP. During the election process, the candidate RP with the highest priority is elected as the RP.
age	The age (in seconds) of this RP-set.
holdtime	Indicates the time in seconds for which this rp-set information is valid.  If this rp-set information is not received from BSR within the holdtime period, the rp-set information is aged out and deleted.

## Examples

The following example shows the RP set list for the device elected as BSR.

```
device> show ip pim rp-set
Static RP
-----
Static RP count: 2
1.51.51.4
1.51.51.5
Number of group prefixes Learnt from BSR: 1
Group prefix = 224.0.0.0/4      # RPs: 2
  RP 1: 1.51.51.1    priority=0    age=60    holdtime=150
  RP 2: 1.51.51.3    priority=0    age=30    holdtime=150
```

The following example shows the RP set list for devices that are not elected as BSR.

```
device> show ip pim rp-set
Static RP
-----
Static RP count: 2
1.51.51.4
1.51.51.5
Number of group prefixes Learnt from BSR: 1
Group prefix = 224.0.0.0/4      # RPs expected: 2
# RPs received: 2
  RP 1: 1.51.51.1    priority=0    age=60    holdtime=150
  RP 2: 1.51.51.3    priority=0    age=30    holdtime=150
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ip pim rpf

Displays what PIM sees as the best reverse path to the source. While there may be multiple routes back to the source, the one displayed by this command is the one that PIM thinks is best.

## Syntax

```
show ip pim [ vrf vrf-name ] rpf A.B.C.D
```

## Parameters

**vrf** *vrf-name*

Displays information for the specified VRF instance.

*A.B.C.D*

Specifies the source address for reverse-path forwarding (RPF) check.

## Modes

User EXEC mode

## Examples

This example shows best reverse path to the specified source:

```
device# show ip pim vrf eng rpf 130.50.11.10
Source 130.50.11.10 directly connected on e1/1
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ip pim traffic

Displays IPv4 PIM traffic statistics.

## Syntax

```
show ip pim traffic
```

## Modes

Privileged EXEC mode

## Usage Guidelines

PIM control packet statistics for interfaces that are configured for standard PIM are listed first by the display.

## Command Output

The **show ip pim traffic** command displays the following information:

Output Field	Description
Port	The port or virtual interface on which the PIM interface is configured.
HELLO	The number of PIM Hello messages sent or received on the interface.
JOIN-PRUNE	The number of Join or Prune messages sent or received on the interface.  <b>NOTE</b> Unlike PIM Dense, PIM Sparse uses the same messages for Joins and Prunes.
ASSERT	The number of Assert messages sent or received on the interface.
REGISTER GRAFT (DM)	The number of Register messages sent or received on the interface.
REGISTER STOP (SM)	The number of Register Stop messages sent or received on the interface.
BOOTSTRAP MSGS (SM)	The number of bootstrap messages sent or received on the interface.
CAND. RP ADV. (SM)	The total number of Candidate-RP-Advertisement messages sent or received on the interface.
Err	The total number of messages discarded, including a separate counter for those that failed the checksum comparison.

show ip pim traffic

## Examples

This example shows PIM join and prune traffic statistics for received and sent packets:

```
device# show ip pim traffic
Port      |HELLO |JOIN  |PRUNE |ASSERT |GRAFT/REGISTER |REGISTER-STOP |BSR-MSGs |RPC-MSGs
          |Rx    |Rx   |Rx   |Rx    |Rx            |Rx          |Rx       |Rx
-----+-----+-----+-----+-----+-----+-----+-----+-----+
Ve10      | 54   | 0    | 0    | 0     | 0            | 0          | 0       | 0
Lo 1      | 0    | 0    | 0    | 0     | 0            | 0          | 0       | 0

device# show ip pim traffic
Port      |HELLO |JOIN  |PRUNE |ASSERT |GRAFT/REGISTER |REGISTER-STOP |BSR-MSGs |RPC-MSGs
          |Tx    |Tx   |Tx   |Tx    |Tx            |Tx          |Tx       |Tx
-----+-----+-----+-----+-----+-----+-----+-----+
Ve10      | 29   | 0    | 0    | 0     | 0            | 0          | 0       | 0
Lo 1      | 28   | 0    | 0    | 0     | 0            | 0          | 0       | 0
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ip pim bsr VRF

Displays bootstrap router (BSR) information.

## Syntax

```
show ip pim [ all-vrf | vrf vrf-name ] bsr
```

## Parameters

### all-vrf

Displays information for all VRFs.

### vrf *vrf-name*

Displays information for a specific VRF instance.

### bsr

Displays BSR information.

## Modes

User EXEC mode

## Usage Guidelines

When entered without the **vrf** option, this command displays information for the default VRF instance.

## Command Output

The **show ip pim bsr** command displays the following information:

Output Field.	Description
BSR address	The IP address of the interface configured as the PIM Sparse BSR.
BSR priority	The priority assigned to the interface for use during the BSR election process. During BSR election, the priorities of the candidate BSRs are compared and the interface with the highest BSR priority becomes the BSR.
Hash mask length	The number of significant bits in the IP multicast group comparison mask. This mask determines the IP multicast group numbers for which the device can be a BSR. The default is 32 bits, which allows the device to be a BSR for any valid IP multicast group number.  <b>NOTE</b> This field appears only if this device is a candidate BSR.
Next bootstrap message in	Indicates how much time will pass before the BSR sends the next bootstrap message. The time is displayed in "hh:mm:ss" format.

Output Field.	Description
	<p><b>NOTE</b> This field appears only if this device is the BSR.</p>
Next Candidate-RP-advertisement message in	<p>Indicates how much time will pass before the BSR sends the next candidate PR advertisement message. The time is displayed in "hh:mm:ss" format.</p> <p><b>NOTE</b> This field appears only if this device is a candidate BSR.</p>
RP	<p>Indicates the IP address of the Rendezvous Point (RP).</p> <p><b>NOTE</b> This field appears only if this device is a candidate BSR.</p>
group prefixes	<p>Indicates the multicast groups for which the RP listed by the previous field is a candidate RP.</p> <p><b>NOTE</b> This field appears only if this device is a candidate BSR.</p>
Candidate-RP-advertisement period	<p>Indicates how frequently the BSR sends candidate RP advertisement messages.</p> <p><b>NOTE</b> This field appears only if this device is a candidate BSR.</p>

## Examples

The following example shows information for a device that has been elected as the BSR.

```
device> show ip pim bsr
PIMv2 Bootstrap information
-----
This system is the Elected BSR
BSR address: 1.51.51.1. Hash Mask Length 32. Priority 255.
Next bootstrap message in 00:01:00
Configuration:
  Candidate loopback 2 (Address 1.51.51.1). Hash Mask Length 32. Priority 255.
Next Candidate-RP-advertisement in 00:01:00
RP: 1.51.51.1
  group prefixes:
    224.0.0.0 / 4
Candidate-RP-advertisement period: 60
```

The following example shows information for a device that is not the BSR.

```
device(config)# show ip pim bsr
PIMv2 Bootstrap information
-----
BSR address: 1.51.51.1. Hash Mask Length 32. Priority 255.
Next Candidate-RP-advertisement in 00:00:30
RP: 1.51.51.3
  group prefixes:
    224.0.0.0 / 4
Candidate-RP-advertisement period: 60
```



## History

Release version	Command history
17.1.01	This command was introduced.

# show ip pim interface VRF

Displays information for PIM interfaces.

## Syntax

```
show ip pim interface VRF { ethernet slot/port-id | loopback loopback-number | ve vlan ID }
```

## Parameters

**loopback** *loopback-number*  
Specifies a loopback interface.

**ve** *ve-number*  
Specifies a virtual interface.

## Modes

Privileged EXEC mode

## Examples

The following example displays the output from the **show ip pim interface** command.

```
device# show ip pim interface
-----+-----+-----+-----+-----+-----+-----+-----+-----+
Interface |Local  |Ver|Mode | Designated Router |TTL| DR
          |Address|  |     | Address          Port |Thr| Prio
-----+-----+-----+-----+-----+-----+-----+-----+-----+
Eth 2/30  55.1.1.1 v2  SM  Itself          1  1
Ve30     30.1.1.1 v2  SM  30.1.1.20     Ve30  1  1
Lo       1 4.4.4.4 v2  SM  Itself 1 1
```

## History

Release version	Command history
17r.1.01	This command was introduced.

# show ip pim neighbor VRF

Displays information about PIM neighbors.

## Syntax

```
show ip pim neighbor [ interface ethernet slot/port | interface ve ve-num ]
```

## Parameters

**interface ethernet** *slot/port*

Displays information for the specified Ethernet interface.

**interface ve** *ve-num*

Displays information for the specified VE interface.

## Modes

User EXEC mode

## Command Output

The **show ip pim neighbor** command displays the following information:

Output Field	Description
Port	The interface through which the device is connected to the neighbor.
Phyport	When there is a virtual interface, this is the physical port to which the neighbor is connected.
Neighbor	The IP interface of the PIM neighbor.
Holdtime sec	Indicates how many seconds the neighbor wants this device to hold the entry for this neighbor in memory. The neighbor sends the Hold Time in Hello packets: <ul style="list-style-type: none"> <li>If the device receives a new Hello packet before the Hold Time received in the previous packet expires, the device updates its table entry for the neighbor.</li> <li>If the device does not receive a new Hello packet from the neighbor before the Hold time expires, the device assumes the neighbor is no longer available and removes the entry for the neighbor.</li> </ul>
Age sec	The number of seconds since the device received the last hello message from the neighbor.
UpTime sec	The number of seconds the PIM neighbor has been up. This timer starts when the device receives the first Hello messages from the neighbor.
VRF	The VRF in which the interface is configured. This can be a VRF that the port was assigned to or the default VRF of the device.
Priority	The DR priority that is used in the DR election process. This can be a configured value or the default value of 1.

## Examples

The following example shows information about PIM neighbors.

```
device(config)# show ip pim neighbor
```

Port	PhyPort	Neighbor	Holdtime	T	PropDelay	Override	Age	UpTime	VRF	Prio
			sec	Bit	msec	msec	sec			
v2	e1/1	2.1.1.2	105	1	500	3000	0	00:44:10	default-vrf	1
v4	e1/2	4.1.1.2	105	1	500	3000	10	00:42:50	default-vrf	1
v5	e1/1	5.1.1.2	105	1	500	3000	0	00:44:00	default-vrf	1
v22	e1/1	22.1.1.1	105	1	500	3000	0	00:44:10	default-vrf	1

Total Number of Neighbors : 4

## History

Release version	Command history
17.1.01	This command was introduced.

# show ip pim rp-candidate VRF

Displays candidate rendezvous point (RP) information.

## Syntax

```
show ip pim rp-candidate
```

## Parameters

**rp-candidate**

Specifies the candidate rendezvous point.

## Modes

User EXEC mode

## Usage Guidelines

When used without the **vrf** option, this command displays information for the default VRF.

## Command Output

The **show ip pim rp-candidate** command displays the following information:

Output Field	Description
Candidate-RP-advertisement in	How time will pass before the BSR sends the next RP message. The time is displayed in "hh:mm:ss" format.  <b>NOTE</b> This field appears only if this device is a candidate RP.
RP	The IP address of the RP.  <b>NOTE</b> This field appears only if this device is a candidate RP.
group prefixes	The multicast groups for which the RP listed by the previous field is a candidate RP.  <b>NOTE</b> This field appears only if this device is a candidate RP.
Candidate-RP-advertisement period	How frequently the BSR sends candidate RP advertisement messages.  <b>NOTE</b> This field appears only if this device is a candidate RP.

## Examples

The following example shows information for a candidate RP.

```
device> show ip pim rp-candidate
Next Candidate-RP-advertisement in 00:00:10
RP: 207.95.7.1
  group prefixes:
    224.0.0.0 / 4
Candidate-RP-advertisement period: 60
```

## History

Release version	Command history
17.1.01	This command was introduced.

# show ip pim rpf VRF

Displays what PIM sees as the best reverse path to the source. While there may be multiple routes back to the source, the one displayed by this command is the one that PIM thinks is best.

## Syntax

```
show ip pim [ vrf vrf-name ] rpf A.B.C.D
```

## Parameters

**vrf** *vrf-name*

Displays information for the specified VRF instance.

*A.B.C.D*

Specifies the source address for reverse-path forwarding (RPF) check.

## Modes

User EXEC mode

## Examples

This example shows best reverse path to the specified source:

```
device# show ip pim vrf eng rpf 130.50.11.10
Source 130.50.11.10 directly connected on e1/1
```

## History

Release version	Command history
17.1.01	This command was introduced.

# show ip pim rp-hash VRF

Displays rendezvous-point (RP) information for a PIM Sparse group.

## Syntax

```
show ip pim rp-hash group-addr
```

## Parameters

*group-addr*

Specifies the address of a PIM Sparse IP multicast group.

## Modes

Privileged EXEC mode

## Command Output

The **show ip pim rp-hash** command displays the following information:

Output Field	Description
RP	Indicates the IP address of the RP for the specified PIM Sparse group.
Info source	Indicates the source of the RP information. It can be a static-RP configuration or learned via the bootstrap router. If RP information is learned from the boot strap, the BSR IP address is also displayed.

## Examples

The following example shows RP information for a PIM Sparse group.

```
device# show ip pim rp-hash 239.255.162.1
RP: 207.95.7.1, v2
Info source: 207.95.7.1, via bootstrap
```

## History

Release version	Command history
17.1.01	This command was introduced.



# show ip pim rp-map VRF

Displays rendezvous-point (RP)-to-group mapping information.

## Syntax

```
show ip pim rp-map
```

## Parameters

**vrf** *vrf-name*

Displays information for the specified VRF instance.

## Modes

User EXEC mode

## Command Output

The **show ip pim rp-map** command displays the following information:

Output Field	Description
Group address	Indicates the PIM Sparse multicast group address using the listed RP.
RP address	Indicates the IP address of the RP for the listed PIM Sparse group.

## Examples

The following example shows RP-to-group mapping.

```
device> show ip pim rp-map
Number of group-to-RP mappings: 6
Group address      RP address
-----
1 239.255.163.1    99.99.99.5
2 239.255.163.2    99.99.99.5
3 239.255.163.3    99.99.99.5
4 239.255.162.1    99.99.99.5
5 239.255.162.2    43.43.43.1
6 239.255.162.3    99.99.99.5
```

## History

Release version	Command history
17.1.01	This command was introduced.

# show ip pim rp-set VRF

Displays rendezvous-point (RP)-set list for the device elected as the bootstrap router (BSR).

## Syntax

```
show ip pim rp-set
```

## Parameters

**all-vrf**

Displays information for all VRF instances.

**vrf** *vrf-name*

Displays information for the specified VRF instance.

## Modes

User EXEC mode

## Command Output

The **show ip pim rp-set** command displays the following information:

Output Field	Description
Number of group prefixes	The number of PIM Sparse group prefixes for which the RP is responsible.
Group prefix	Indicates the multicast groups for which the RP listed by the previous field is a candidate RP.
RPs expected or received	Indicates how many RPs were expected and received in the latest bootstrap message.
RP <i>num</i>	Indicates the RP number. If there are multiple RPs in the PIM Sparse domain, a line of information for each RP is listed, in ascending numerical order.
priority	The RP priority of the candidate RP. During the election process, the candidate RP with the highest priority is elected as the RP.
age	The age (in seconds) of this RP-set.
holdtime	Indicates the time in seconds for which this rp-set information is valid.  If this rp-set information is not received from BSR within the holdtime period, the rp-set information is aged out and deleted.

## Examples

The following example shows the RP set list for the device elected as BSR.

```
device> show ip pim rp-set
Static RP
-----
Static RP count: 2
1.51.51.4
1.51.51.5
Number of group prefixes Learnt from BSR: 1
Group prefix = 224.0.0.0/4      # RPs: 2
  RP 1: 1.51.51.1    priority=0    age=60    holdtime=150
  RP 2: 1.51.51.3    priority=0    age=30    holdtime=150
```

The following example shows the RP set list for devices that are not elected as BSR.

```
device> show ip pim rp-set
Static RP
-----
Static RP count: 2
1.51.51.4
1.51.51.5
Number of group prefixes Learnt from BSR: 1
Group prefix = 224.0.0.0/4      # RPs expected: 2
  # RPs received: 2
  RP 1: 1.51.51.1    priority=0    age=60    holdtime=150
  RP 2: 1.51.51.3    priority=0    age=30    holdtime=150
```

## History

Release version	Command history
17.1.01	This command was introduced.

# show ip pim traffic VRF

Displays IPv4 PIM traffic statistics.

## Syntax

```
show ip pim traffic [ vrf vrf-name ]
```

## Parameters

**vrf** *vrf-name*

Specifies information for a VRF instance.

## Modes

Privileged EXEC mode

## Usage Guidelines

PIM control packet statistics for interfaces that are configured for standard PIM are listed first by the display.

## Command Output

The **show ip pim traffic** command displays the following information:

Output Field	Description
Port	The port or virtual interface on which the PIM interface is configured.
HELLO	The number of PIM Hello messages sent or received on the interface.
JOIN-PRUNE	The number of Join or Prune messages sent or received on the interface.  <b>NOTE</b> Unlike PIM Dense, PIM Sparse uses the same messages for Joins and Prunes.
ASSERT	The number of Assert messages sent or received on the interface.
REGISTER GRAFT (DM)	The number of Register messages sent or received on the interface.
REGISTER STOP (SM)	The number of Register Stop messages sent or received on the interface.
BOOTSTRAP MSGS (SM)	The number of bootstrap messages sent or received on the interface.
CAND. RP ADV. (SM)	The total number of Candidate-RP-Advertisement messages sent or received on the interface.
Err	The total number of messages discarded, including a separate counter for those that failed the checksum comparison.

## Examples

This example shows PIM join and prune traffic statistics for received and sent packets:

```

device# show ip pim traffic
Port      |HELLO |JOIN  |PRUNE |ASSERT |GRAFT/REGISTER |REGISTER-STOP |BSR-MSGs |RPC-MSGs
          |Rx    |Rx    |Rx    |Rx    |Rx            |Rx            |Rx        |Rx
-----+-----+-----+-----+-----+-----+-----+-----+-----+
Ve10      | 54   | 0    | 0    | 0    | 0            | 0            | 0        | 0
Lo 1      | 0    | 0    | 0    | 0    | 0            | 0            | 0        | 0

device# show ip pim traffic
Port      |HELLO |JOIN  |PRUNE |ASSERT |GRAFT/REGISTER |REGISTER-STOP |BSR-MSGs |RPC-MSGs
          |Tx    |Tx    |Tx    |Tx    |Tx            |Tx            |Tx        |Tx
-----+-----+-----+-----+-----+-----+-----+-----+
Ve10      | 29   | 0    | 0    | 0    | 0            | 0            | 0        | 0
Lo 1      | 28   | 0    | 0    | 0    | 0            | 0            | 0        | 0

```

## History

Release version	Command history
17.1.01	This command was introduced.

# show ip route

Displays IP route information for IPv4 interfaces.

## Syntax

```
show ip route [ vrf vrf-name ]
show ip route A.B.C.D [ vrf vrf-name ]
show ip route A.B.C.D/M [ longer ] [ vrf vrf-name ]
show ip route all [ vrf vrf-name ]
show ip route bgp [ vrf vrf-name ]
show ip route connected [ vrf vrf-name ]
show ip route import [ src-vrf-name ] [ vrf vrf-name ]
show ip route isis
show ip route nexthop [ nexthopID [ ref-routes ] ] [ vrf vrf-name ]
show ip route ospf [ vrf vrf-name ]
show ip route slot line-card-number [ A.B.C.D | A.B.C.D/M ] [ vrf vrf-name ]
show ip route static [ vrf vrf-name ]
show ip route summary [ vrf vrf-name ]
show ip route system-summary
```

## Parameters

**vrf vrf-name**  
Specifies routes for a selected VRF instance.

**A.B.C.D/M**  
Specifies the IPv4 address and optional mask.

**longer**  
Specifies routes that match the specified prefix.

**all**  
Specifies information for all configured IPv4 routes.

**bgp**  
Specifies BGP route information.

**connected**  
Specifies directly connected routes, such as local Layer 3 interfaces.

**import**  
Specifies imported IPv4 routes.

**src-vrf-name**  
Specifies a VRF instance from which routes are leaked.

**isis**

Specifies routes under the Intermediate System to Intermediate System (IS-IS) protocol.

**nexthop**

Specifies the configured next hop.

*next-hop-ID*

Valid values range from 0 through 4294967294.

**ref-routes**

Specifies all routes that point to the specified *next-hop ID*.

**ospf**

Specifies routes learned from the Open Shortest Path First (OSPF) protocol.

**slot line-card-number**

Specifies routes with the provided line card number.

**static**

Specifies configured static routes.

**summary**

Specifies summary information for all routes.

**system-summary**

Specifies a system-level routing summary.

## Modes

Privileged EXEC mode

## Usage Guidelines

If leaked subnet routes are present, that information displays in the output.

To view the status of management routes, use the **show ip route vrf** command and enter **mgmt-vrf** as follows. You must enter the name of the management VRF manually. Example output is shown below.

```
device# show ip route vrf mgmt-vrf
IP Routing Table for VRF "mgmt-vrf"
Total number of IP routes: 3
 '*' denotes best ucast next-hop
 '[x/y]' denotes [preference/metric]

0.0.0.0/0
  *via 10.25.96.1, mgmt 1, [1/1], 8d15h, static, tag 0
10.25.96.0/22, attached
  *via DIRECT, mgmt 1, [0/0], 8d15h, direct, tag 0
10.25.96.38/32, attached
  *via DIRECT, mgmt 1, [0/0], 8d15h, local, tag 0
```

## Examples

The following example displays output for the **system-summary** option.

```
device# show ip route system-summary
System Route Count: 3 Max routes: 4096 (Route limit not exceeded)
System Nexthop Count: 2 Max nexthops: 1024 (Nexthop limit not exceeded)

VRF-Name: default-vrf
  Route count: 0 Max routes: Not Set (Route limit not exceeded)
  0 connected, 0 static, 0 RIP, 0 OSPF, 0 BGP, 0 ISIS, 0 unnumbered

VRF-Name: mgmt-vrf
  Route count: 3 Max routes: Not Set (Route limit not exceeded)
  1 connected, 1 static, 0 RIP, 0 OSPF, 0 BGP, 0 ISIS, 0 unnumbered
```

The following example displays output for the **connected** option.

```
device# show ip route connected
Type Codes - B:BGP D:Connected I:ISIS O:OSPF R:RIP S:Static; Cost - Dist/Metric
BGP Codes - i:iBGP e:eBGP
ISIS Codes - L1:Level-1 L2:Level-2
OSPF Codes - i:Inter Area 1:External Type 1 2:External Type 2 s:Sham Link
  Destination      Gateway           Port           Cost           Type Uptime
1      1.1.1.0/24      DIRECT           Te 2/1         0/0            D    4m33s
2      1.1.2.0/24      DIRECT           Te 2/2         0/0            D    2m42s
```

The following example displays output for the **summary** option.

```
device# show ip route summary
IP Routing Table - 7 entries:
  8 direct, 0 static, 0 RIP, 0 OSPF, 8 BGP, 0 ISIS, 80 EVPN Host
Number of prefixes:
  /24: 7
Nexthop Table Entry - 4 entries
```

The following example displays output for the **nexthop** option.

```
device# show ip route nexthop
Total number of IP nexthop entries: 4; Forwarding Use: 4
  NexthopIp      Port           RefCount      ID           Age
1      1.1.1.2      Te 2/1        3/3          2147549184 277
2      0.0.0.0      Te 2/2        1/1          2147484008 191
3      0.0.0.0      Te 2/1        2/2          2147484009 302
4      1.1.1.2      Te 2/1        1/1          2147549185 190
      1.1.2.2      Te 2/2
```

The following example displays output for a specific next-hop ID option.

```
device# show ip route nexthop 2147549184
  NexthopIp      Port           RefCount      ID           Age
1      1.1.1.2      Te 2/1        3/3          2147549184 288
```

The following example displays output for the **ref-routes** option.

```
device# show ip route nexthop 2147549184 ref-routes
Type Codes - B:BGP D:Connected I:ISIS O:OSPF R:RIP S:Static; Cost - Dist/Metric
BGP Codes - i:iBGP e:eBGP
ISIS Codes - L1:Level-1 L2:Level-2
OSPF Codes - i:Inter Area 1:External Type 1 2:External Type 2 s:Sham Link
  Destination      Gateway           Port           Cost           Type Uptime
1      100.1.1.0/24    1.1.1.2         Te 2/1         1/1            S    5m10s
2      100.1.2.0/24    1.1.1.2         Te 2/1         1/1            S    4m54s
3      100.1.3.0/24    1.1.1.2         Te 2/1         1
```



The following example displays output for a specific IP address.

```
device# show ip route 100.1.1.1
Type Codes - B:BGP D:Connected I:ISIS O:OSPF R:RIP S:Static; Cost - Dist/Metric
BGP Codes - i:iBGP e:eBGP
ISIS Codes - L1:Level-1 L2:Level-2
OSPF Codes - i:Inter Area 1:External Type 1 2:External Type 2 s:Sham Link
      Destination      Gateway      Port      Cost      Type  Uptime
4      100.1.1.0/24      1.1.1.2      Te 2/1      1/1      S      5m37s
```

The following example displays output for the **longer** option.

```
device# show ip route 100.0.0.0/8 longer
1      100.1.1.0/24      1.1.1.2      Te 2/1      1/1      S      14m37s
2      100.1.2.0/24      1.1.1.2      Te 2/1      1/1      S      14m21s
3      100.1.3.0/24      1.1.1.2      Te 2/1      1/1      S      14m18s
4      100.2.1.0/24      DIRECT      Te 2/1      1/1      S      14m2s
5      100.3.1.0/24      1.1.1.2      Te 2/1      1/1      S      13m10s
      100.3.1.0/24      1.1.2.2      Te 2/2      1/1      S      13m10s
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ipv6 bgp

Displays BGP4+ route information.

## Syntax

```
show ipv6 bgp
```

```
show ipv6 bgp ipv6-addr [ /prefix ]
```

```
show ipv6 bgp ipv6-addr [ /prefix ] [ longer-prefixes ] [ vrf vrf-name ]
```

## Parameters

*ipv6-addr*

IPv6 address of a neighbor in dotted-decimal notation, with optional mask.

*/prefix*

IPv6 mask length in CIDR notation.

**longer-prefixes**

Filters on prefixes equal to or greater than that specified by *prefix*.

**vrf** *vrf-name*

Specifies a VRF instance.

## Modes

Privileged EXEC mode

## Examples

This example displays sample output from the **show ipv6 bgp** command.

```
device# show ipv6 bgp
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ipv6 bgp attribute-entries

Displays BGP4+ route-attribute entries that are stored in device memory.

## Syntax

```
show ipv6 bgp attribute-entries [ vrf vrf-name ]
```

## Parameters

**vrf vrf-name**  
Specifies a VRF instance.

## Modes

Privileged EXEC mode

## Usage Guidelines

The route-attribute entries table lists the sets of BGP4+ attributes that are stored in device memory. Each set of attributes is unique and can be associated with one or more routes. In fact, the device typically has fewer attribute entries than routes. Use this command to view BGP4+ route-attribute entries that are stored in device memory.

## Examples

This example show sample output for the **show ipv6 bgp attribute-entries** command.

```
device# show ipv6 bgp attribute-entries

Total number of BGP Attribute Entries: 1
1      Next Hop      : ::                                MED      :0          Origin:INCOMP
      Originator:0.0.0.0          Cluster List:None
      Aggregator:AS Number :0          Router-ID:0.0.0.0          Atomic:None
      Local Pref:100          Communities:Internet
      AS Path      : (length 0)
      AsPathLen: 0 AsNum: 0, SegmentNum: 0, Neighboring As: 0, Source As 0
      Address: 0x0b456c4c Hash:876 (0x03000000)
      Links: 0x00000000, 0x00000000
      Reference Counts: 1:0:1, Magic: 2
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ipv6 bgp dampened-paths

Displays all BGP4+ dampened routes.

## Syntax

```
show ipv6 bgp dampened-paths [ vrf vrf-name ]
```

## Parameters

**vrf** *vrf-name*  
Specifies a VRF instance.

## Modes

Privileged EXEC mode

## Examples

The following example shows sample output from the **show ipv6 bgp dampened-paths** command.

```
device# show ipv6 bgp dampened-paths

      Status Code >:best d:damped h:history *:valid
      Network
Since   Reuse      Path                               From                               Flaps
*d 110:110:110:4::/64          160:160:160::10          36  0 :2 :
54  0 :10:10    111
*d 110:110:110:3::/64          160:160:160::10          36  0 :2 :
54  0 :10:10    111
*d 110:110:110:2::/64          160:160:160::10          36  0 :2 :
54  0 :10:10    111
*d 110:110:110:1::/64          160:160:160::10          36  0 :2 :
54  0 :10:10    111
*d 110:110:110::/64           160:160:160::10          36  0 :2 :
54  0 :10:10    111
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ipv6 bgp filtered-routes

Displays BGP4+ filtered routes that are received from a neighbor or peer group.

## Syntax

```
show ipv6 bgp filtered-routes [ detail ] [ ipv6-addr { / mask } [ longer-prefixes ] ] | as-path-access-list name | prefix-list name ] [ vrf vrf-name ]
```

## Parameters

### detail

Optionally displays detailed route information.

### ipv6-addr

IPv6 address of the destination network in dotted-decimal notation.

### mask

IPv6 mask of the destination network in CIDR notation.

### longer-prefixes

Specifies all statistics for routes that match the specified route, or that have a longer prefix than the specified route.

### as-path-access-list name

Specifies an AS-path ACL. The name must be between 1 and 32 ASCII characters in length.

### prefix-list name

Specifies an IP prefix list. The name must be between 1 and 32 ASCII characters in length.

### vrf vrf-name

Specifies a VRF instance.

## Modes

Privileged EXEC mode

## Examples

This example displays BGP4+ filtered routes.

```
device# show ipv6 bgp filtered-routes
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ipv6 bgp flap-statistics

Displays BGP4+ route-dampening statistics for all dampened routes with a variety of options.

## Syntax

```
show ipv6 bgp flap-statistics
```

```
show ipv6 bgp flap-statistics ipv6-addr { / mask } [ longer-prefixes [ vrf vrf-name ] | vrf vrf-name ]
```

```
show ipv6 bgp flap-statistics neighbor ipv6-addr [ vrf vrf-name ]
```

```
show ipv6 bgp flap-statistics regular-expression name [ vrf vrf-name ]
```

```
show ipv6 bgp flap-statistics vrf vrf-name
```

## Parameters

*ipv6-addr*

IPv6 address of a specified route in dotted-decimal notation.

*mask*

IPv6 mask of a specified route in CIDR notation.

**longer-prefixes**

Displays statistics for routes that match the specified route or have a longer prefix than the specified route.

**vrf** *vrf-name*

Specifies a VRF instance.

**neighbor**

Displays flap statistics only for routes learned from the specified neighbor.

*ip-addr*

IPv6 address of the neighbor.

**regular-expression**

Specifies a regular expression in the display output on which to filter.

*name*

Name of an AS-path filter or regular expression.

## Modes

Privileged EXEC mode

## Examples

This example displays flap statistics for a neighbor.

```
device# show ipv6 bgp flap-statistics neighbor 2001:
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ipv6 bgp neighbors

Displays configuration information and statistics for BGP4+ neighbors of the device.

## Syntax

```
show ipv6 bgp neighbors [ ipv6-addr ]  
show ipv6 bgp neighbors last-packet-with-error [ vrf vrf-name ]  
show ipv6 bgp neighbors routes-summary [ vrf vrf-name ]  
show ipv6 bgp neighbors vrf vrf-name
```

## Parameters

*ipv6-addr*

IPv6 address of a neighbor in dotted-decimal notation.

**last-packet-with-error**

Displays the last packet with an error.

**route-summary**

Displays routes received, routes accepted, number of routes advertised by peer, and so on.

**vrf** *vrf-name*

Specifies a VRF instance.

## Modes

Privileged EXEC mode

## Usage Guidelines

Use this command to view configuration information and statistics for BGP4+ neighbors of the device. Output shows all configured parameters for the neighbors. Only the parameters whose values differ from defaults are shown.



## Examples

This example shows sample output from the show ipv6 bgp neighbors command.

```
device# show ipv6 bgp neighbors

Total number of BGP Neighbors: 1
1  IP Address: 1:2::3, AS: 100 (IBGP), RouterID: 0.0.0.0, VRF: default-vrf
   State: CONNECT, Time: 0h3m3s, KeepAliveTime: 60, HoldTime: 180
   Minimal Route Advertisement Interval: 0 seconds
   Messages:   Open      Update  KeepAlive  Notification  Refresh-Req
     Sent      : 0        0        0          0              0
     Received: 0        0        0          0              0
   Last Connection Reset Reason:Unknown
   Notification Sent:      Unspecified
   Notification Received: Unspecified
   Neighbor NLRI Negotiation:
     Peer configured for IPV6 unicast Routes
   Neighbor ipv6 MPLS Label Capability Negotiation:
   Neighbor AS4 Capability Negotiation:
   Outbound Policy Group:
     ID: 2, Use Count: 3
     Last update time was 172 sec ago
   Error: TCP status not available
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ipv6 bgp neighbors advertised-routes

Displays the routes that the device has advertised to the neighbor during the current BGP4+ session.

## Syntax

```
show ipv6 bgp neighbors ipv6-addr advertised-routes [ detail | / mask-bits ] [ vrf vrf-name ]
```

## Parameters

*ipv6-addr*

IPv6 address of a neighbor in dotted-decimal notation.

**detail**

Displays details of advertised routes.

*mask-bits*

Number of mask bits in CIDR notation.

**vrf** *vrf-name*

Specifies a VRF instance.

## Modes

Privileged EXEC mode

## Examples

This example displays the details of advertised routes.

```
device# show ipv6 bgp neighbors 123::3 advertised-routes

      There are 5 routes advertised to neighbor 123::3
Status A:AGGREGATE B:BEST b:NOT-INSTALLED-BEST E:EBGP I:IBGP L:LOCAL
Prefix      Next Hop      MED      LocPrf      Weight      Status
1  110:110:110::/64  123::2      0          0          0          BE
   AS_PATH: 222 111
2  110:110:110:1::/64 123::2      0          0          0          BE
   AS_PATH: 222 111
3  110:110:110:2::/64 123::2      0          0          0          BE
   AS_PATH: 222 111
4  110:110:110:3::/64 123::2      0          0          0          BE
   AS_PATH: 222 111
5  110:110:110:4::/64 123::2      0          0          0          BE
   AS_PATH: 222 111
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ipv6 bgp neighbors flap-statistics

Displays the route flap statistics for routes received from or sent to a BGP4+ neighbor.

## Syntax

```
show ipv6 bgp neighbors ipv6-addr flap-statistics [ vrf vrf-name ]
```

## Parameters

*ipv6-addr*

IPv6 address of a neighbor in dotted-decimal notation.

**vrf** *vrf-name*

Specifies a VRF instance.

## Modes

Privileged EXEC mode

## Examples

This example shows flap statistics.

```
device#
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ipv6 bgp neighbors last-packet-with-error

Displays information about the last packet that contained an error from any of a device's neighbors.

## Syntax

```
show ipv6 bgp neighbors ipv6-addr last-packet-with-error [ decode ] [ vrf vrf-name ]
```

## Parameters

*ipv6-addr*

IPv6 address of a neighbor in dotted-decimal notation.

**decode**

Decodes last packet that contained an error from any of a device's neighbors.

**vrf** *vrf-name*

Specifies a VRF instance.

## Modes

Privileged EXEC mode

## Examples

This example shows sample output from the **show ipv6 bgp neighbors last-packet-with-error** command when no packet from a specified neighbor contained an error.

```
device# show ipv6 bgp neighbors 123::3 last-packet-with-error

Received Message Length: 45
BGP Message:
 0xffffffff 0xffffffff 0xffffffff 0xffffffff 0x002d0104
 0x014b00b4 0x09090909 0x10020601 0x04020000 0x01020202
 0x00020280 0x00

BGP Header
Marker: 0xffffffff 0xffffffff 0xffffffff 0xffffffff
Message Length: (0x002d) 45
Message Type: (0x01) OPEN

OPEN Message
Version: (0x04) 4
AS Number: (0x014b) 331
Hold Time: (0x00b4) 180
BGP Identifier: (0x09090909) 9.9.9.9
Optional Parameter length: (0x10) 16

OPEN message optional parameters
Parameter Type: (0x02) Capability
Parameter Length: (0x06) 6
  Capability Type: (0x01) MULTIPROTOCOL EXTENSIONS
  Capability Length: (0x04) 4
  AFI: (0x0200) Unknown(512)
  Reserved: (0x00) 0
  SAFI: (0x01) Unicast

Parameter Type: (0x02) Capability
Parameter Length: (0x02) 2
  Capability Type: (0x02) ROUTE REFRESH(new)
  Capability Length: (0x00) 0

Parameter Type: (0x02) Capability
Parameter Length: (0x02) 2
  Capability Type: (0x80) ROUTE REFRESH(old)
  Capability Length: (0x00) 0
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ipv6 bgp neighbors received

Displays Outbound Route Filters (ORFs) received from BGP4+ neighbors of the device.

## Syntax

**show ipv6 bgp neighbors** *ipv6-addr* **received**

**show ipv6 bgp neighbors** *ipv6-addr* **received detail** [ *vrf vrf-name* ]

**show ipv6 bgp neighbors** *ipv6-addr* **received prefix-filter** [ *vrf vrf-name* ]

**show ipv6 bgp neighbors** *ipv6-addr* **vrf** *vrf-name* ]

## Parameters

*ipv6-addr*

IPv6 address of a neighbor in dotted-decimal notation.

**detail**

Displays detailed information for ORFs received from BGP4+ neighbors of the device.

**vrf** *vrf-name*

Specifies a VRF instance.

**prefix-filter**

Displays the results for ORFs that are prefix-based.

## Modes

Privileged EXEC mode

## Examples

The following example shows sample output from the **show ipv6 bgp neighbors received** command when the **prefix-filter** keyword is used.

```
device# show ipv6 bgp neighbors 2001:db8:93e8:cc00::1 received prefix-filter
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ipv6 bgp neighbors received-routes

Lists all route information received in route updates from BGP4+ neighbors of the device since the soft-reconfiguration feature was enabled.

## Syntax

```
show ipv6 bgp neighbors ipv6-addr received-routes [ detail ] [ vrf vrf-name ]
```

## Parameters

*ipv6-addr*

IPv4 address of a neighbor in dotted-decimal notation.

**detail**

Displays detailed route information.

**vrf** *vrf-name*

Specifies a VRF instance.

## Modes

Privileged EXEC mode

## Examples

This example displays the .

```
device# show ipv6 bgp neighbors 160:160:160::10 received-routes

      There are 5 received routes from neighbor 160:160:160::10
Status A:AGGREGATE B:BEST b:NOT-INSTALLED-BEST C:CONFED_EBGP D:DAMPED
      E:EBGP H:HISTORY I:IBGP L:LOCAL M:MULTIPATH m:NOT-INSTALLED-MULTIPATH
      S:SUPPRESSED F:FILTERED s:STALE
      Prefix          Next Hop          MED           LocPrf        Weight Status
  1    110:110:110::/64  160:160:160::10  0              100           0       BE
      AS_PATH: 111
  2    110:110:110:1::/64 160:160:160::10  0              100           0       BE
      AS_PATH: 111
  3    110:110:110:2::/64 160:160:160::10  0              100           0       BE
      AS_PATH: 111
  4    110:110:110:3::/64 160:160:160::10  0              100           0       BE
      AS_PATH: 111
  5    110:110:110:4::/64 160:160:160::10  0              100           0       BE
      AS_PATH: 111
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ipv6 bgp neighbors rib-out-routes

Displays information about BGP4+ outbound RIB routes.

## Syntax

```
show ipv6 bgp neighbors ipv6-addr rib-out-routes ipv6-addr mask [ vrf vrf-name ]
show ipv6 bgp neighbors ipv6-addr rib-out-routes detail ipv6-addr mask [ vrf vrf-name ]
show ipv6 bgp neighbors ipv6-addr rib-out-routes detail [ vrf vrf-name ]
show ipv6 bgp neighbors ipv6-addr rib-out-routes [ vrf vrf-name ]
```

## Parameters

*ipv6-addr*  
IPv6 address of a neighbor in dotted-decimal notation.

*vrf vrf-name*  
Specifies a VRF instance.

**detail**  
Displays detailed RIB route information.

## Modes

Privileged EXEC mode

## Examples

This example shows sample output from the **show ipv6 bgp neighbors rib-out-routes** command.

```
device# show ipv6 bgp neighbors 123::3 rib-out-routes

      There are 5 RIB_out routes for neighbor 123::3
Status A:AGGREGATE B:BEST b:NOT-INSTALLED-BEST E:EBGP I:IBGP L:LOCAL
Prefix      Next Hop      MED      LocPrf      Weight      Status
1      110:110:110::/64      160:160:160::10      0      100      0      BE
      AS_PATH: 111
2      110:110:110:1::/64      160:160:160::10      0      100      0      BE
      AS_PATH: 111
3      110:110:110:2::/64      160:160:160::10      0      100      0      BE
      AS_PATH: 111
4      110:110:110:3::/64      160:160:160::10      0      100      0      BE
      AS_PATH: 111
5      110:110:110:4::/64      160:160:160::10      0      100      0      BE
      AS_PATH: 111
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# show ipv6 bgp neighbors routes

Lists a variety of route information received in UPDATE messages from BGP4+ neighbors.

## Syntax

```
show ipv6 bgp neighbors ipv6-addr routes [ vrf vrf-name ]
show ipv6 bgp neighbors ipv6-addr routes [ best | not-installed-best | unreachable [ vrf vrf-name ] ]
show ipv6 bgp neighbors ipv6-addr routes detail [ best | not-installed-best | unreachable [ vrf vrf-name ] ]
show ipv6 bgp neighbors ipv6-addr routes detail [ vrf vrf-name ]
```

## Parameters

*ipv6-addr*

IPv6 address of a neighbor in dotted-decimal notation.

**best**

Displays routes received from the neighbor that are the best BGP4+ routes to their destination.

**not-installed-best**

Displays routes received from the neighbor that are the best BGP4+ routes to their destination but were not installed in the route table because the device received better routes from other sources.

**unreachable**

Displays routes that are unreachable because the device does not have a valid OSPF or static route to the next hop.

**vrf** *vrf-name*

Specifies a VRF instance.

**detail**

Displays detailed information for the specified route types.

## Modes

Privileged EXEC mode

## Examples

This example shows sample output from the **show ipv6 bgp neighbors routes** command when the **best** keyword is used.

```
device# show ipv6 bgp neighbor 2001:db8::106 routes best
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ipv6 bgp neighbors routes-summary

Lists all route information received in UPDATE messages from BGP4+ neighbors.

## Syntax

```
show ipv6 bgp neighbors ipv6-addr routes-summary [ vrf vrf-name ]
```

## Parameters

*ipv6-addr*

IPv6 address of a specified route in dotted-decimal notation.

**vrf** *vrf-name*

Specifies a VRF instance.

## Modes

Privileged EXEC mode

## Command Output

The **show ipv6 bgp neighbors routes-summary** command displays the following information.

Output field	Description
IP Address	The IPv6 address of the neighbor
Routes Received	How many routes the device has received from the neighbor during the current BGP4+ session: <ul style="list-style-type: none"> <li>Accepted or Installed - Indicates how many of the received routes the device accepted and installed in the BGP4+ route table.</li> <li>Filtered or Kept - Indicates how many routes were filtered out, but were nonetheless retained in memory for use by the soft reconfiguration feature.</li> <li>Filtered - Indicates how many of the received routes were filtered out.</li> </ul>
Routes Selected as BEST Routes	The number of routes that the device selected as the best routes to their destinations.
BEST Routes not Installed in IPv6 Forwarding Table	The number of routes received from the neighbor that are the best BGP4+ routes to their destinations, but were nonetheless not installed in the IPv6 route table because the device received better routes from other sources (such as OSPFv3, or static IPv6 routes).
Unreachable Routes	The number of routes received from the neighbor that are unreachable because the device does not have a valid OSPFv3, or static IPv6 route to the next hop.
History Routes	The number of routes that are down but are being retained for route flap dampening purposes.

Output field	Description
NLRIs Received in Update Message	The number of routes received in Network Layer Reachability (NLRI) format in UPDATE messages: <ul style="list-style-type: none"> <li>Withdraws - The number of withdrawn routes the device has received.</li> <li>Replacements - The number of replacement routes the device has received.</li> </ul>
NLRIs Discarded due to	Indicates the number of times the device discarded an NLRI for the neighbor due to the following reasons: <ul style="list-style-type: none"> <li>Maximum Prefix Limit - The device's configured maximum prefix amount had been reached.</li> <li>AS Loop - An AS loop occurred. An AS loop occurs when the BGP4+ AS-path attribute contains the local AS number.</li> <li>Invalid Nexthop Address - The next hop value was not acceptable.</li> <li>Duplicated Originator_ID - The originator ID was the same as the local router ID.</li> <li>Cluster_ID - The cluster list contained the local cluster ID, or contained the local router ID (see above) if the cluster ID is not configured.</li> </ul>
Routes Advertised	The number of routes the device has advertised to this neighbor: <ul style="list-style-type: none"> <li>To be Sent - The number of routes the device has queued to send to this neighbor.</li> <li>To be Withdrawn - The number of NLRIs for withdrawing routes the device has queued up to send to this neighbor in UPDATE messages.</li> </ul>
NLRIs Sent in Update Message	The number of NLRIs for new routes the device has sent to this neighbor in UPDATE messages: <ul style="list-style-type: none"> <li>Withdraws - The number of routes the device has sent to the neighbor to withdraw.</li> <li>Replacements - The number of routes the device has sent to the neighbor to replace routes the neighbor already has.</li> </ul>
Peer Out of Memory Count for	Statistics for the times the device has run out of BGP4+ memory for the neighbor during the current BGP4+ session: <ul style="list-style-type: none"> <li>Receiving Update Messages - The number of times UPDATE messages were discarded because there was no memory for attribute entries.</li> <li>Accepting Routes(NLRI) - The number of NLRIs discarded because there was no memory for NLRI entries. This count is not included in the Receiving Update Messages count.</li> <li>Attributes - The number of times there was no memory for BGP4+ attribute entries.</li> <li>Outbound Routes (RIB-out) - The number of times there was no memory to place a "best" route into the neighbor's route information base (Adj-RIB-Out) for routes to be advertised.</li> <li>Outbound Routes Holder - For debugging purposes only.</li> </ul>

show ipv6 bgp neighbors routes-summary

## Examples

This example shows sample output from the **show ipv6 bgp neighbors routes-summary** command.

```
device# show ipv6 bgp neighbors routes-summary
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ipv6 bgp peer-group

Displays peer-group information.

## Syntax

```
show ipv6 bgp peer-group peer-group-name [ vrf vrf-name ]
```

## Parameters

*peer-group-name*

Specifies a peer group name.

**vrf** *vrf-name*

Specifies a VRF instance.

## Modes

Privileged EXEC mode

## Usage Guidelines

Only the parameters that have values different from their defaults are listed.

## Examples

This example shows sample output from the **show ipv6 bgp peer-group** command.

```
device# show ipv6 bgp peer-group

1  BGP peer-group is pg
   Address family : IPV4 Unicast
   activate
   Address family : IPV6 Unicast
   no activate
   Members:
   IP Address: 1.1.1.1, AS: 100
   IP Address: 1::1, AS: 100

2  BGP peer-group is pg6
   Address family : IPV4 Unicast
   activate
   Address family : IPV6 Unicast
   no activate
   Currently there are no members.
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ipv6 bgp routes

Displays BGP4+ route information that is filtered by the table entry at which the display starts.

## Syntax

```
show ipv6 bgp routes [ num | ipv6-address/prefix | age num | as-path-access-list name | best | cidr-only | community-access-list name | community-reg-expression expression | detail | local | neighbor ipv6-addr | nexthop ipv6-addr | no-best | not-installed-best | prefix-list string | regular-expression name | route-map name | summary | unreachable ] [ vrf vrf-name ]
```

## Parameters

*num*

Table entry at which the display starts.

*ipv6-address/prefix*

Table entry at which the display starts.

**age**

Displays BGP4+ route information that is filtered by age.

**as-path-access-list** *name*

Displays BGP4+ route information that is filtered by autonomous system (AS)-path access control list (ACL). The name must be between 1 and 32 ASCII characters in length.

**best**

Displays BGP4+ route information that the device selected as best routes.

**cidr-only**

Displays BGP4+ routes whose network masks do not match their class network length.

**community-access-list** *name*

Displays BGP4+ route information for an AS-path community access list. The name must be between 1 and 32 ASCII characters in length.

**community-reg-expression** *expression*

Displays BGP4+ route information for an ordered community-list regular expression.

**detail**

Displays BGP4+ detailed route information.

**local**

Displays BGP4+ route information about selected local routes.

**neighbor** *ip-addr*

Displays BGP4+ route information about selected BGP neighbors.

**nexthop** *ip-addr*

Displays BGP4+ route information about routes that are received from the specified next hop.

**no-best**

Displays BGP4+ route information that the device selected as not best routes.

**not-installed-best**

Displays BGP4+ route information about best routes that are not installed.

**prefix-list** *string*

Displays BGP4+ route information that is filtered by prefix list. The string must be between 1 and 32 ASCII characters in length.

**regular-expression** *name*

Displays BGP4+ route information about routes that are associated with the specified regular expression.

**route-map** *name*

Displays BGP4+ route information about routes that use the specified route map.

**summary**

Displays BGP4+ summary route information.

**unreachable**

Displays BGP4+ route information about routes whose destinations are unreachable through any of the BGP4+ paths in the BGP4+ route table.

**vrf** *vrf-name*

Specifies a VRF instance.

## Modes

Privileged EXEC mode

## Examples

This example shows sample input from the **show ipv6 bgp routes** command.

```
device# show ipv6 bgp routes

Total number of BGP Routes: 1
Status A:AGGREGATE B:BEST b:NOT-INSTALLED-BEST C:CONFED_EBGP D:DAMPED
E:EBGP H:HISTORY I:IBGP L:LOCAL M:MULTIPATH m:NOT-INSTALLED-MULTIPATH
S:SUPPRESSED F:FILTERED s:STALE
Prefix           Next Hop           MED           LocPrf        Weight Status
1      107:1:1::/64      ::              0              100           32768 BL
AS_PATH:
```

This example shows sample input from the **show ip bgp routes** command when the **summary** keyword is used.

```
device# show ipv6 bgp routes summary

Total number of BGP routes (NLRIs) Installed      : 1
Distinct BGP destination networks                 : 1
Filtered bgp routes for soft reconfig              : 0
Routes originated by this router                   : 1
Routes selected as BEST routes                     : 1
Routes Installed as BEST routes                    : 1
BEST routes not installed in IP forwarding table   : 0
Unreachable routes (no IGP route for NEXTHOP)     : 0
IBGP routes selected as best routes                : 0
EBGP routes selected as best routes                : 0
BEST routes not valid for IP forwarding table       : 0
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# show ipv6 bgp routes community

Displays BGP4+ route information that is filtered by community and other options.

## Syntax

```
show ipv6 bgp routes community { num | internet | local-as | no-advertise | no-export } [ vrf vrf-name ]
```

## Parameters

### community

Displays routes filtered by a variety of communities.

### *num*

Specific community member.

### internet

Displays routes for the Internet community.

### local-as

Displays routes for a local sub-AS within the confederation.

### no-advertise

Displays routes with this community that cannot be advertised to any other BGP4+ devices at all.

### no-export

Displays routes for the community of sub-ASs within a confederation.

### vrf *vrf-name*

Specifies a VRF instance.

## Modes

Privileged EXEC mode

## Examples

The following example shows output from the **show ipv6 bgp routes community** command when the **internet** keyword is used.

```
device# show ipv6 bgp routes community internet
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ipv6 bgp summary

Displays BGP information such as the local autonomous system number (ASN), maximum number of routes supported, and some BGP4+ statistics.

## Syntax

```
show ipv6 bgp summary [ vrf vrf-name ]
```

## Parameters

**vrf vrf-name**  
Specifies a VRF instance.

## Modes

Privileged EXEC mode

## Examples

This example displays summary BGP4+ information.

```
device# show ipv6 bgp summary

BGP4 Summary
Router ID: 107.1.1.8   Local AS Number: 100
Confederation Identifier: not configured
Confederation Peers:
Maximum Number of IP ECMP Paths Supported for Load Sharing: 1
Number of Neighbors Configured: 1, UP: 0
Number of Routes Installed: 1, Uses 96 bytes
Number of Routes Advertising to All Neighbors: 1 (1 entries), Uses 60 bytes
Number of Attribute Entries Installed: 1, Uses 104 bytes
Neighbor Address  AS#      State   Time    Rt:Accepted  Filtered  Sent    ToSend
1:2::3           100     CONN   0h 0m18s  0           0         0       1
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ipv6 counters interface

Displays ipv6 statistics for an interface.

## Syntax

```
show ipv6 counters interface [ ethernet slot/port | loopback loopback-number | ve ve-number ]
```

## Parameters

### interface

Specifies an interface.

### ethernet *slot/port*

Specifies physical Ethernet interface and a valid slot and port on it.

### loopback *loopback-number*

Specifies the loopback interface.

### ve *ve-number*

Specifies the virtual Ethernet (ve) number.

## Modes

Privileged EXEC mode

## Examples

The following is an example of the **show ipv6 counters interface** command output.

```
device# show ipv6 counters interface ethernet 1/1
Interface Ethernet 1/1 IPv6 statistics (ifindex 406896641)
```

## History

Release version	Command history
16.1.00	This command was introduced.

# show ipv6 dhcp relay address interface

Displays IPv6 DHCP Relay addresses configured on supported interfaces.

## Syntax

```
show ipv6 dhcp relay address interface [ ethernet slot/port | ve interface number ]
```

## Parameters

### ethernet

Specifies the ethernet interface.

### slot

Specifies a valid slot number.

### port

Specifies a valid port number.

### ve

Specifies the Ve interface.

### interface number

Specifies the Ve interface number.

## Modes

Privileged EXEC mode

## Examples

The following example displays IPv6 DHCP relay address(es) configured per interface.

```
device# show ipv6 dhcp relay address interface ethernet 3/21
```

Interface	Relay Address	VRF Name	Outgoing Interface
Eth 3/21	4001::101	default-vrf	
Eth 3/21	fe80::8	blue	Ve 100

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ipv6 dhcp relay statistics

Displays general information about the DHCPv6 Relay function.

## Syntax

```
show ipv6 dhcp relay statistics
```

## Modes

Privileged EXEC mode

## Usage Guidelines

The **show ipv6 dhcp relay statistics** command displays the following information about the IP DHCP Relay function for IP DHCP Relay addresses configured on the device:

- Number of DHCP Error packets dropped.
- Number of DHCP SOLICIT, REQUEST, CONFIRM, RENEW, REBIND, RELEASE, DECLINE, INFORMATION-REQUEST, RELAY-FORWARD, RELAY-REPLY packets received.
- Number of DHCP RELAY-FORWARD, REPLY packets sent.

## Examples

To display statistics for the device:

```
device# show ipv6 dhcp relay statistics

Packets dropped          : 0
  Error                  : 0
Packets received        : 0
  SOLICIT                 : 0
  REQUEST                 : 0
  CONFIRM                 : 0
  RENEW                   : 0
  REBIND                  : 0
  RELEASE                 : 0
  DECLINE                 : 0
  INFORMATION-REQUEST    : 0
  RELAY-FORWARD          : 0
  RELAY-REPLY             : 0
Packets sent            : 0
  RELAY-FORWARD          : 0
  REPLY                   : 0
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ipv6 interface

Displays details of IPv6 interfaces.

## Syntax

```
show ipv6 interface [ brief | ethernet slot/port | loopback loopback-port-number | ve ve_id ]
```

## Parameters

### brief

Displays brief interface information.

### ethernet

Specifies Ethernet interface.

#### *slot*

Specifies a valid slot number.

#### *port*

Specifies a valid port number.

### loopback *loopback-port-number*

Specifies the loopback interface. The range is from 1 to 255.

### ve *ve-id*

Specifies the VE ID of a virtual Ethernet (VE) interface. The range is from 1 to 4096.

## Modes

Privileged EXEC mode

Interface configuration mode

## Examples

The following example displays the output of the **show ipv6 interface** command with an Ethernet interface specified:

```
device# show ipv6 interface ethernet 2/25
Ethernet 2/25 is up protocol is up
IPv6 Address: 2025:2525:aaaa::1/64 Primary Confirmed
IPv6 Address: 2500:ffee:1234::12/64 Secondary Confirmed
IPv6 Address: 2500:ffee:1234::14/64 Secondary Confirmed
IPv6 Address: 2500:ffee:1234::16/64 Secondary Confirmed
IPv6 Address: fe80::748e:f8ff:fe09:e10d/128 Link-local Confirmed
IPv6 multicast groups locally joined:
  ff02::1
  ff02::2    ff02::1:ff00:1    ff02::1:ff00:12
  ff02::1:ff00:14    ff02::1:ff00:16    ff02::1:ff09:e10d
IPv6 MTU: 1500
Vrf : default-vrf
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ipv6 nd

Displays the router advertisement information.

## Syntax

```
show ipv6 nd interface [ ethernet slot/port | prefix | ve ve-number | vrf vrf-name ]
```

## Parameters

### interface

Specifies an interface.

### ethernet *slot/port*

Specifies physical Ethernet interface and a valid slot and port on it.

### prefix

Displays prefix information.

### ve *ve-number*

Specifies the virtual Ethernet (ve) number.

### vrf *vrf-name*

Specifies a VRF instance.

## Modes

Privileged EXEC mode

## Examples

The following is an example of the **show ipv6 nd** command output.

```
device# show ipv6 nd interface ethernet 3/5
ICMPv6 ND Interfaces for VRF default-vrf
IPv6 address: 2ffe::1
Router-Advertisement active timers:
  Last Router-Advertisement sent: 00:01:25
  Next Router-Advertisement sent in: 00:07:06
Router-Advertisement parameters:
  Periodic interval: 200 to 600 seconds
  Send 'Managed Address Configuration' flag: false
  Send 'Other Stateful Configuration' flag: false
  Send 'Current Hop Limit' field: 64
  Send 'MTU' option value: 1500
  Send 'Router Lifetime' field: 1800 secs
  Send 'Reachable Time' field: 0 ms
  Send 'Retrans Timer' field: 0 ms
  Suppress RA: false
  Suppress MTU in RA: false
  Suppress All RA: false
Neighbor-Solicitation parameters:
  NS retransmit interval: 1 secs
  DAD Attempts: 2
  DAD expiry: 1 secs
  Neighbor Cache Expiry: 14400 secs
```



## History

Release version	Command history
16.1.00	This command was introduced.

# show ipv6 neighbor

Displays the IPv6 neighbors.

## Syntax

```
show ipv6 neighbor [ ipv6-address | ethernet slot/port | static | dynamic | summary | ve ] vrf vrf-name
```

## Parameters

*ipv6-address*

Restricts the display to the entries for the specified IPv6 address. Specify this parameter in hexadecimal using 16-bit values between colons as documented in RFC 2373.

**ethernet** *slot/port*

Restricts the display to the entries for the specified Ethernet interface.

**static**

Displays the static IPv6 neighbors.

**dynamic**

Displays the dynamic IPv6 neighbors .

**summary**

Displays the summary of IPv6 neighbors.

**ve** *ve-num*

Restricts the display to the entries for the specified VE interface. The range is from 1 to 4096.

**vrf** *vrf-name*

Displays the IPv6 neighbor information for the specified Virtual Routing/Forwarding (VRF) instance.

## Modes

User EXEC mode

## Examples

The following example displays the IPv6 neighbor table.

```
device# show ipv6 neighbor summary
No of Total Entries   No of Static Entries   No of Dynamic Entries
-----
2003                   0                       2003
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ipv6 ospf

Displays OSPFv3 information.

## Syntax

```
show ipv6 ospf [ vrf name ]
```

## Parameters

*vrf name*

Specifies the name of the VRF instance.

## Modes

Privileged EXEC mode

## Examples

The following example shows sample output from the show ipv6 ospf command.

```
device# show ipv6 ospf
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ipv6 ospf area

Displays the OSPFv3 area table in a specified format.

## Syntax

```
show ipv6 ospf area [ A.B.C.D ] [ decimal ] [ vrf vrfname ]
```

## Parameters

*A.B.C.D*

Area address in dotted decimal format.

*decimal*

Area address in decimal format. Valid values range from 0 to 2147483647.

**vrf** *vrf name*

Specifies a non-default VRF instance.

## Modes

Privileged EXEC mode

## Examples

The following example shows sample output from the **show ipv6 ospf area** command when no arguments or keywords are used.

```
device# show ipv6 ospf area
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ipv6 ospf database

Displays lists of information about different OSPFv3 link-state advertisements (LSAs).

## Syntax

```
show ipv6 ospf database [ advrtr A.B.C.D | extensive | grace | link-id decimal | prefix ipv6-addr ] [ vrf vrfname ]
show ipv6 ospf database [ as-external | inter-prefix | inter-router | intra-prefix | link [ decimal ] | network | router | type-7 ]
  [ advrtr A.B.C.D | link-id decimal ] [ vrf vrfname ]
show ipv6 ospf database scope { area { A.B.C.D | decimal } | as | link } [ vrf vrfname ]
show ipv6 ospf database summary [ all-vrfs | vrf vrfname ]
```

## Parameters

**advrtr** *A.B.C.D*

Displays LSAs by Advertising Router Id in dotted decimal format.

**extensive**

Displays detailed lists of LSA information.

**grace**

Displays grace LSA information.

**link-id** *decimal*

Link-state ID that differentiates LSAs. Valid values range from 1 through 4294967295.

**prefix**

Display LSAs that contain a prefix.

*ipv6-addr*

Specifies an IPv6 address.

**vrf vrf** *name*

Specifies a non-default VRF instance.

**as-external**

Displays information about external LSAs.

**inter-prefix**

Displays information about inter area prefix LSAs.

**inter-router**

Displays information about inter area router LSAs.

**intra-prefix**

Displays information about intra area prefix LSAs.

**link** *decimal*

Displays information about the link LSAs.

**network**

Displays information about network LSAs.

<b>router</b>	Displays information about router LSAs.
<b>type-7</b>	Displays information about the not so stubby area (NSSA) external LSAs.
<b>scope</b>	Displays LSA information by LSA scope.
<b>area</b>	Displays LSAs by scope within a specified area.
<b>as</b>	Displays autonomous system (AS) LSAs by scope.
<b>link</b>	Displays link LSAs by scope.
<b>summary</b>	Displays LSA summary information.
<b>all-vrfs</b>	Specifies all VRFs.

## Modes

Privileged EXEC mode

## Examples

The following is sample output from the **show ipv6 ospf database as-external** command using the **link-id** keyword:

```
device# show ipv6 ospf database as-external link-id 5
```

The following is sample output from the **show ipv6 ospf database inter-prefix** command using the **link-id** keyword:

```
device# show ipv6 ospf database inter-prefix link-id 5
```

The following is sample output from the **show ipv6 ospf database network** command:

```
device# show ipv6 ospf database network
```

The following is sample output from the **show ipv6 ospf database router** command:

```
device# show ipv6 ospf database router
```

The following is sample output from the **show ipv6 ospf database type-7** command:

```
device# show ipv6 ospf database type-7
```

The following is sample output from the **show ipv6 ospf database scope** command using the **area** keyword:

```
device# show ipv6 ospf database scope area 0
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ipv6 ospf interface

Displays interface information for all or specific OSPFv3-enabled interfaces.

## Syntax

```
show ipv6 ospf interface brief [ all-vrfs | vrf vrf-name ]
```

```
show ipv6 ospf interface [ ethernet slot/port | loopback number | ve vlan_id ]
```

```
show ipv6 ospf interface [ vrf vrf-name ]
```

## Parameters

### brief

Displays summary information.

### all-vrfs

Displays the information for all VRF instances.

### vrf *vrf-name*

Specifies the name of the VRF instance. If this option is not used, details for the default VRF are shown in the output.

### ethernet *slot/port*

Specifies an Ethernet slot and port.

### loopback *number*

Specifies a loopback port number. Valid values range from 1 through 255.

### ve *vlan\_id*

Specifies a virtual Ethernet (VE) interface. Valid values range from 1 through 4096.

## Modes

Privileged EXEC mode

## Examples

The following is sample output from the **show ipv6 ospf interface** command when no arguments or keywords are used.

The following is sample output from the **show ipv6 ospf interface** command the **brief** keyword is used.

## History

Release version	Command history
16r.1.00	This command was introduced.



# show ipv6 ospf memory

Displays information about OSPFv3 memory usage.

## Syntax

```
show ipv6 ospf memory [ vrf vrfname ]
```

## Parameters

**vrf** *vrfname*

Displays the information for the specified VRF instance.

## Modes

Privileged EXEC mode

## Examples

The following is sample output from the **show ipv6 ospf memory** command when no arguments or keywords are used:

```
device# show ipv6 ospf memory
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ipv6 ospf neighbor

Displays detailed or summary OSPFv3 neighbor information.

## Syntax

```
show ipv6 ospf neighbor [ all-vrfs | vrf vrf-name ]
show ipv6 ospf neighbor detail [ vrf vrf-name ]
show ipv6 ospf neighbor interface [ ethernet slot/port | loopback number | ve vlan_id ]
show ipv6 ospf neighbor router-id A.B.C.D [ vrf vrf-name ]
```

## Parameters

### all-vrfs

Specifies all VRF instances.

### vrf *vrf-name*

Specifies a non-default VRF instance.

### detail

Specifies detailed neighbor information.

### interface

Displays OSPFv3 interface information.

### ethernet *slot/port*

Specifies an Ethernet slot and port.

### loopback *number*

Specifies a loopback port number. Valid values range from 1 through 255.

### ve *vlan\_id*

Specifies a virtual Ethernet (VE) interface. Valid values range from 1 through 4096.

### router-id *A.B.C.D*

Specifies neighbor information for the specified router ID (in dotted decimal format).

## Modes

Privileged EXEC mode

## Examples

The following example shows sample output from the **show ipv6 ospf neighbor** command when no arguments or keywords are used.

```
device# show ipv6 ospf neighbor
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ipv6 ospf redistribute route

Displays all IPv6 routes or a specified IPv6 route that the device has redistributed into OSPFv3.

## Syntax

```
show ipv6 ospf redistribute route A.B.C.D:M [ vrf vrf-name ]
```

```
show ipv6 ospf redistribute route [ vrf vrf-name ]
```

## Parameters

*A.B.C.D:M*

Specifies an IPv6 address.

**vrf** *vrfname*

Specifies the name of a VRF instance.

## Modes

Privileged EXEC mode

## Examples

The following is sample output from the **show ipv6 ospf redistribute route** command when no arguments or keywords are used:

```
device# show ipv6 ospf redistribute route
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ipv6 ospf routes

Displays OSPFv3 routes.

## Syntax

```
show ipv6 ospf routes A.B.C.D:M [ vrf vrfname ]
```

```
show ipv6 ospf routes [ vrf vrfname ]
```

## Parameters

*A.B.C.D:M*

Specifies a destination IPv6 address.

vrf *vrfname*

Specifies a VRF instance.

## Modes

Privileged EXEC mode

## Examples

The following example displays OSPFv3-calculated routes.

```
device# show ipv6 ospf routes
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ipv6 ospf spf

Displays OSPFv3 SPF node, table, and tree information.

## Syntax

```
show ipv6 ospf spf { node | table | tree } [ area { A.B.C.D | decimal } ] [ vrf vrfname ]
```

## Parameters

### node

Displays OSPFv3 node information.

### table

Specifies a SPF table.

### tree

Specifies a SPF tree.

### area

Specifies an area.

*A.B.C.D*

Area address in dotted decimal format.

*decimal*

Area address in decimal format.

### vrf vrfname

Specifies a non-default VRF instance.

## Examples

The following example shows sample output from the **show ipv6 ospf spf** command when the **node** keyword is used.

```
device# show ipv6 ospf spf node
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ipv6 ospf summary

Displays summary information for all OSPFv3 instances.

## Syntax

```
show ipv6 ospf summary [ all-vrfs | vrf vrfname ]
```

## Parameters

### all-vrfs

Specifies all VRF instances.

### vrf *vrfname*

Specifies a non-default VRF instance.

## Modes

Privileged EXEC mode

## Examples

The following example shows sample output from the **show ipv6 ospf summary** command when no arguments or keywords are used.

```
device# show ipv6 ospf summary
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ipv6 ospf virtual-links

Displays information about all OSPFv3 virtual links or specified links.

## Syntax

```
show ipv6 ospf virtual-links brief [ vrf vrfname ]
```

```
show ipv6 ospf virtual-links [ vrf vrfname ]
```

## Parameters

**brief**

Displays summary information.

**vrf** *vrfname*

Specifies a non-default VRF instance.

## Modes

Privileged EXEC mode

## Examples

The following is sample output from the **show ipv6 ospf virtual-links** command when no arguments or keywords are used:

```
device# show ipv6 ospf virtual-links
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# show ipv6 ospf virtual-neighbor

Displays information about OSPFv3 virtual neighbors.

## Syntax

```
show ipv6 ospf virtual-neighbor brief [ vrf vrfname ]
```

```
show ipv6 ospf virtual-neighbor [ vrf vrfname ]
```

## Parameters

**brief**

Displays summary information.

**vrf** *vrfname*

Specifies a nondefault VRF instance.

## Modes

Privileged EXEC mode

## Examples

The following example shows sample output from the **show ipv6 ospf virtual-neighbor** command when no arguments or keywords are used.

```
device# show ipv6 ospf virtual-neighbor
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ipv6 prefix-list

Displays IPv6 prefix-lists.

## Syntax

```
show ipv6 prefix-list prefix-list-name
```

## Parameters

*prefix-list-name*

Specifies an IPv6 prefix list name.

## Modes

User EXEC mode

## Usage Guidelines

The *prefix-list-name* parameter restricts the display to the specified prefix list. Specify the name of the prefix list that you want to display.

## Command Output

The **show ipv6 prefix-list** command displays the following information:

## Examples

The following example shows how to display IPv6 prefix lists.

```
device# show ipv6 prefix-lists
ipv6 prefix-list routesfor2001: 2 entries
  seq 5 permit 2001::/16
  seq 10 permit 2001:db8::/32
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ipv6 route

Displays the router advertisement information.

## Syntax

```
show ipv6 route [ all | bgp | connected | import source-name | nexthop nexthop-id | ospf | static | summary | system-  
summary ] vrf-name
```

```
show ipv6 route [ isis | slot linecard-number | static | system-summary | vrf number ]
```

## Parameters

**all**

Specifies all routes.

**bgp**

Specifies BGP routes.

**connected**

Displays the directly connected routes.

**import** *source-name*

Specifies import routes and the source VRF name

**isis**

Specifies ISIS routes.

**nexthop** *nexthop-id*

Displays the route nexthop table.

**ospf**

Specifies OSPF routes.

**slot** *linecard-number*

Specifies the IPv6 route information on a slot and the linecard number.

**static**

Specifies static IPv6 routes.

**summary**

Displays the route summary.

**system-summary**

Displays the system-level summary for IPv6 routes.

*vrf-name*

The name of the VRF context.

**vrf** *number*

Specifies a VRF instance.

## Modes

Privileged EXEC mode

## Examples

The following is an example of the **show ipv6 route** command output.

```
SLX# show ipv6 route
IPv6 Routing Table for VRF "default-vrf"
Total number of IPv6 routes: 11
'*' denotes best ucast next-hop
'[x/y]' denotes [preference/metric]

1200:1201::/64, attached
  *via ::, Eth 2/45, [0/0], 45m29s, direct, tag 0
1200:1201::1:1/128, attached
  *via ::, Eth 2/45, [0/0], 45m29s, local, tag 0
1200:1202::/64, attached
  *via ::, Ve 2, [0/0], 45m26s, direct, tag 0
1200:1202::1:1/128, attached
  *via ::, Ve 2, [0/0], 45m26s, local, tag 0
2221::/32
  *via 1200:1201::1:2, Eth 2/45, [100/10], 11m41s, static, tag 300
2222::/48
  *via fe80::205:33ff:fee6:a531, Eth 2/45, [1/1], 43m44s, static, tag 0
2222::1/128
  *via fe80::205:33ff:fee6:a531, Eth 2/45, [110/1], 0m7s, ospfv3, intra, tag 0
2223::/64
  *via 1200:1202::1:2, Ve 2, [1/1], 3m45s, static, tag 0
2224::1/128
  *via fe80::205:33ff:fee6:a501, Ve 2, [1/1], 43m41s, static, tag 0
fe80::/10, attached
  *via ::, , [0/0], 6h30m, local, tag 0
ff00::/8, attached
  *via ::, Null0, [0/0], 6h30m, local, tag 0
```

## History

Release version	Command history
16.1.00	This command was introduced.

# show ipv6 static route

Displays information about IPv6 static routes.

## Syntax

```
show ipv6 static route [ ipv6prefix | vrf vrf-name ]
```

## Parameters

*ipv6prefix*

The IPv6 prefix in the *A:B::/length* format.

*vrf vrf-name*

The name of the VRF context.

## Modes

Privileged EXEC mode

## Examples

The following example displays the IPv6 static route information for the default VRF.

```
SLX# show ipv6 static route
IPv6 Configured Static Routes for VRF "default-vrf"

3002:7::/64-> 1200:3::1:2 preference: 1
  nh_vrf (default-vrf)

3002:9::/64-> 1200:4::1:2 preference: 1
  nh_vrf (default-vrf)
SLX#
```

# show ipv6 vrrp

Displays information about IPv6 VRRP and VRRP-E sessions.

## Syntax

```
show ipv6 vrrp
show ipv6 vrrp VRID [ detail | summary ]
show ipv6 vrrp detail
show ipv6 vrrp summary [ vrf { vrf-name | all | default-vrf } ]
show ipv6 vrrp interface [ ethernet slot/port ] [ detail | summary ]
show ipv6 vrrp interface ve vlan_id [ detail | summary ]
```

## Parameters

*VRID*

The virtual group ID about which to display information. The range is from 1 through 16.

**detail**

Displays all session information in detail, including session statistics.

**summary**

Displays session-information summaries.

**vrf**

Specifies a VRF instance or all VRFs.

*vrf-name*

Specifies a VRF instance. For the default vrf, enter **default-vrf**.

**all**

Specifies all VRFs.

**interface**

Displays information for an interface that you specify.

**ethernet** *slot port*

Specifies a valid, physical Ethernet interface with a slot and port number.

**ve** *vlan\_id*

Specifies the VE VLAN number.

## Modes

Privileged EXEC mode

## Usage Guidelines

Use this command to display information about IPv6 VRRP and VRRP-E sessions, either in summary or full-detail format. You can also specify a particular virtual group ID, or an interface for which to display VRRP output.

**NOTE**

IPv6 VRRP-E supports only the VE interface type.

To display information for IPv6 VRRP sessions using the default VRF, you can use the **show ipv6 vrrp summary** syntax (with no additional parameters).

To display information for the default or a named VRF, you can use the **show ipv6 vrrp summary vrf** syntax with the *vrf-name* option.

To display information about all VRFs, use the **show ipv6 vrrp summary vrf all** syntax.

## Examples

The following example displays information about all IPv6 VRRP sessions on the device.

```
device# show ipv6 vrrp

Total number of VRRP session(s)   : 2

VRID 14
  Interface: Ve 2018; Ifindex: 1207961570
  Mode: VRRP
  Admin Status: Enabled
  Description :
  Address family: IPv6
  Version: 3
  Authentication type: No Authentication
  State: Master
  Session Master IP Address: Local
  Virtual IP(s): fe80::1
  Configured Priority: unset (default: 100); Current Priority: 100
  Advertisement interval: 1000 milli sec (default: 1000 milli sec)
  Preempt mode: ENABLE (default: ENABLE)
  Hold time: 0 sec (default: 0 sec)
  Trackport:
    Port(s)                Priority  Port Status
    =====                =====  =====
  Statistics:
    Advertisements: Rx: 0, Tx: 35
    Neighbor Advertisements: Tx: 1

VRID 15
  Interface: Ve 2019; Ifindex: 1207961571
  Mode: VRRP
  Admin Status: Enabled
  Description :
  Address family: IPv6
  Version: 3
  Authentication type: No Authentication
  State: Master
  Session Master IP Address: Local
  Virtual IP(s): fe80::1
  Configured Priority: unset (default: 100); Current Priority: 100
  Advertisement interval: 1000 milli sec (default: 1000 milli sec)
  Preempt mode: ENABLE (default: ENABLE)
  Hold time: 0 sec (default: 0 sec)
  Trackport:
    Port(s)                Priority  Port Status
    =====                =====  =====
  Statistics:
    Advertisements: Rx: 0, Tx: 448
    Neighbor Advertisements: Tx: 1
```

The following example displays IPv6 VRRP information in detail for a specific virtual group ID of 19, including session statistics.

```
device# show ipv6 vrrp 19 detail

Total number of VRRP session(s)   : 1
VRID 15
Interface: Ve 2019; Ifindex: 1207961571
Mode: VRRPE
Admin Status: Enabled
Description :
Address family: IPv6
Version: 3
Authentication type: No Authentication
State: Backup
Session Master IP Address: fe80::205:33ff:fe79:fb1e
Virtual IP(s): 2001:2019:8192::1
Virtual MAC Address: 02e0.5200.2513
Configured Priority: unset (default: 100); Current Priority: 100
Advertisement interval: 1 sec (default: 1 sec)
Preempt mode: DISABLE (default: DISABLED)
Advertise-backup: ENABLE (default: DISABLED)
Backup Advertisement interval: 60 sec (default: 60 sec)
Short-path-forwarding: Enabled
Revert-Priority: unset; SPF Reverted: No
Hold time: 0 sec (default: 0 sec)
Master Down interval: 4 sec
Trackport:
  Port(s)                Priority  Port Status
  =====                =====  =====
Global Statistics:
=====
Checksum Error : 0
Version Error  : 0
VRID Invalid   : 0
Session Statistics:
=====
Advertisements      : Rx: 103259, Tx: 1721
Neighbor Advertisements : Tx: 0
Session becoming master : 0
Advts with wrong interval : 0
Prio Zero pkts       : Rx: 0, Tx: 0
Invalid Pkts Rcvd    : 0
Bad Virtual-IP Pkts  : 0
Invalid Authentication type : 0
Invalid TTL Value    : 0
Invalid Packet Length : 0
VRRPE backup advt sent : 1721
VRRPE backup advt recvd : 0
```

The following example displays summary information for IPv6 VRRP statistics on the default VRF. (This command is equivalent to **show ipv6 vrrp summary vrf default-vrf**.)

```
device# show ipv6 vrrp summary

Total number of VRRP session(s)   : 1
Master session count : 1
Backup session count  : 0
Init session count   : 0

VRID  Session  Interface  Admin  Current  State  Short-path  Revert  SPF
=====  =====  =====  =====  =====  =====  =====  =====  =====
15     VRRPE     Ve 2019   Enabled 100     Master  Enabled    unset   No
```



The following example displays summary information for IPv6 VRRP statistics on the VRF named red.

```
device# show ipv6 vrrp summary vrf red
```

```
Total number of VRRP session(s) : 1
Master session count : 1
Backup session count : 0
Init session count : 0
```

VRID	Session	Interface	Admin State	Current Priority	State	Short-path Forwarding	Revert Priority	SPF Reverted
14	VRRPE	Ve 2018	Enabled	100	Master	Enabled	unset	No

The following example displays summary information for IPv6 VRRP statistics on all VRFs.

```
device# show ipv6 vrrp summary vrf all
```

```
Total number of VRRP session(s) : 2
Master session count : 2
Backup session count : 0
Init session count : 0
```

VRID	Session	Interface	Admin State	Current Priority	State	Short-path Forwarding	Revert Priority	SPF Reverted
14	VRRPE	Ve 2018	Enabled	100	Master	Enabled	unset	No
15	VRRPE	Ve 2019	Enabled	100	Master	Enabled	unset	No

The following example displays information for IPv6 VRRP-E tracked networks.

```

device# show ipv6 vrrp detail

Total number of VRRP session(s)   : 1

VRID 2
Interface: Ve 100;  Ifindex: 1207959652
Mode: VRRPE
Admin Status: Enabled
Description :
Address family: IPv6
Version: 3
Authentication type: No Authentication
State: Master
Session Master IP Address: Local
Virtual IP(s): 2001:2019:8192::1
Virtual MAC Address: 02e0.5225.1002
Configured Priority: unset (default: 100); Current Priority: 100
Advertisement interval: 1 sec (default: 1 sec)
Preempt mode: DISABLE (default: DISABLED)
Advertise-backup: DISABLE (default: DISABLED)
Backup Advertisement interval: 60 sec (default: 60 sec)
Short-path-forwarding: Disabled
Revert-Priority: unset; SPF Reverted: No
Hold time: 0 sec (default: 0 sec)
Master Down interval: 4 sec
Trackport:
  Port(s)                Priority  Port Status
  =====                =====  =====

Tracknetwork:
  Network(s)              Priority  Status
  =====                =====  =====
  2001::/64                20      Up

Global Statistics:
=====
Checksum Error : 0
Version Error  : 0
VRID Invalid   : 0

Session Statistics:
=====
Advertisements           : Rx: 0, Tx: 132
Neighbor Advertisements  :           : Tx: 66
Session becoming master  : 1
Advts with wrong interval : 0
Prio Zero pkts           : Rx: 0, Tx: 0
Invalid Pkts Rvcd        : 0
Bad Virtual-IP Pkts      : 0
Invalid Authentication type : 0
Invalid TTL Value        : 0
Invalid Packet Length     : 0
VRRPE backup advt sent   : 0
VRRPE backup advt recvd  : 0

```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show isis

Displays general IS-IS information.

## Syntax

**show isis**

## Modes

Privileged EXEC mode

## Command Output

The **show isis** command displays the following information:

Output field	Description
IS-IS Routing Protocol Operation State	The operating state of IS-IS. Possible states include the following: <ul style="list-style-type: none"> <li>• Enabled - IS-IS is enabled.</li> <li>• Disabled - IS-IS is disabled.</li> </ul>
IS-Type	The intermediate system type. Possible types include the following: <ul style="list-style-type: none"> <li>• Level 1 only - The device routes traffic only within the area in which it resides.</li> <li>• Level 2 only - The device routes traffic between areas of a routing domain.</li> <li>• Level 1-2 - The device routes traffic within the area in which it resides and between areas of a routing domain.</li> </ul>
System ID	The unique IS-IS router ID. Typically, the device's base MAC address is used as the system ID.
Manual area address(es)	Area address(es) of the device.
Level-1-2 Database State	The state of the Level 1-2 Database: <ul style="list-style-type: none"> <li>• On</li> <li>• Off</li> </ul>
Administrative Distance	The current setting of the IS-IS administrative distance.
Maximum Paths	The number of paths IS-IS can calculate and install in the forwarding table
Default redistribution metric	The value of the default redistribution metric, which is the IS-IS cost of redistributing the route into IS-IS.
Number of Routes redistributed into IS-IS	The number of routes distributed into IS-IS.
Level-1 Auth-mode	One of the following authentication modes set for Level-1 on the router: <ul style="list-style-type: none"> <li>• None</li> <li>• md5</li> <li>• cleartext</li> </ul>
Level-2 Auth-mode	One of the following authentication modes set for Level-2 on the router: <ul style="list-style-type: none"> <li>• None</li> <li>• md5</li> </ul>

Output field	Description
	<ul style="list-style-type: none"> <li>• cleartext</li> </ul>
Metric Style Supported for Level-1	<p>The following values are supported:</p> <ul style="list-style-type: none"> <li>• Wide - Wide Metric Style</li> <li>• Narrow - Narrow Metric Style</li> </ul>
Metric Style Supported for Level-2	<p>The following values are supported:</p> <ul style="list-style-type: none"> <li>• Wide - Wide Metric Style</li> <li>• Narrow - Narrow Metric Style</li> </ul>
IS-IS Partial SPF Optimizations	<p>This parameter can contain one of the following values:</p> <ul style="list-style-type: none"> <li>• Enabled</li> <li>• Disabled</li> </ul>
Timers: L1 or L2 SPF:	These values are displayed individually for IS-IS levels 1 and 2.
max-wait	The maximum time gap that occurs between running of SPF calculations. It is the value configured as the <code>spf-max-wait</code> variable in the <code>spf-interval</code> command.
Init-wait	The initial time gap between an SPF event and the first running of SPF. This value reflects the <code>spf-initial-time</code> variable that is configured using the <code>spf-interval</code> command.
Second-wait	<p>The interval between the first running of SPF and the first recalculation of the SPF tree. If this optional value is configured, it is doubled with each recalculation of the SPF tree until the value is equal to the max-wait value</p> <p>This value reflects the <code>spf-second-wait</code> variable that is configured using the <code>spf-interval</code> command.</p>
SPF run status.	<p>This field is not specifically labeled but is displayed directly under the SPF timers. It can any of the three values shown below:</p> <ul style="list-style-type: none"> <li>• SPF is running</li> <li>• SPF will run in <code>sec</code> where the <code>sec</code> variable is a value in seconds until the next time that SPF will be run.</li> <li>• SPF is not scheduled</li> </ul>
Timers: PSPF:	
max-wait	The maximum time gap that occurs between running of PSPF calculations. It is the value configured as the <code>max-wait</code> value in the <code>partial-spf-interval</code> command.
Init-wait	The initial time gap between the wait time after an LSP change until the first PSPF calculation. This value reflects the <code>initial-wait</code> variable that is configured using the <code>partial-spf-interval</code> command.
Second-wait	<p>The wait time between the first and second PSPF calculations. If this optional value is configured, it is doubled with each PSPF recalculation until the value is equal to the max-wait value</p> <p>This value reflects the <code>second-wait</code> variable that is configured using the <code>partial-spf-interval</code> command.</p>
PSPF run status.	<p>This field is not specifically labeled but is displayed directly under the PSPF timers. It can any of the three values shown below:</p> <ul style="list-style-type: none"> <li>• PSPF is running</li> <li>• PSPF will run in <code>sec</code> where the <code>sec</code> variable is a value in seconds until the next time that PSPF will be run.</li> <li>• PSPF is not scheduled</li> </ul>
Timers: LSP:	

Output field	Description
max-lifetime	The maximum number of seconds an unrefreshed LSP can remain in the device's LSP database. The default value is 1000 sec.
refresh-interval	The maximum number of seconds that a device waits between sending updated LSPs to its IS-IS neighbors. The default value is 1 sec.
gen-interval	The minimum number of seconds that a device waits between sending updated LSPs to its IS-IS neighbors. The default value is 10 sec.
retransmit-interval	The amount of time the device waits before it retransmits LSPs. The default value is 5 sec.
lsp-interval	The rate of transmission (in milliseconds) of the LSPs. The default rate is 33 ms.
Timers: SNP:	
cstp-interval	How often the designated IS sends a CSNP to the broadcast interface. The default value is 10 sec.
psnp-interval	How often the IS sends a PSNP. The default value is 2 sec.
Global Hello Padding	This value can be: <ul style="list-style-type: none"> <li>• Enabled</li> <li>• Disabled</li> </ul>
Global Hello Padding For Point to Point Circuits	This value can be: <ul style="list-style-type: none"> <li>• Enabled</li> <li>• Disabled</li> </ul>
Ptpt Three Way HandShake Mechanism	This value can be: <ul style="list-style-type: none"> <li>• Enabled</li> <li>• Disabled</li> </ul>
IS-IS Traffic Engineering Support	This value can be: <ul style="list-style-type: none"> <li>• Enabled</li> <li>• Disabled</li> </ul>
BFD	This value can be: <ul style="list-style-type: none"> <li>• Enabled</li> <li>• Disabled</li> </ul>
Interfaces with IPv4 IS-IS configured	Interfaces on which IPv4 IS-IS is configured.

## Examples

The following example displays sample output from the **show isis** command.

```
device# show isis

IS-IS Routing Protocol Operation State: Enabled
IS-Type: Level-1-2
System Id: 768e.f805.5812
Manual area address(es): 11
Level-1-2 Database State: On
Administrative Distance 115
Maximum Paths 8
Default redistribution metric 0
Default link metric for level-1 0 (conf)/ 10 (adv)
Default link metric for level-2 0 (conf)/ 10 (adv)
Protocol Routes Redistributed into IS-IS: None
Number of Routes Redistributed into IS-IS: 0
Level-1 Auth-mode: None
Level-2 Auth-mode: None
Metric Style Supported for Level-1: Narrow
Metric Style Supported for Level-2: Narrow
Graceful-Restart Helper Support: Enabled
ISIS Partial SPF Optimizations: Enabled
Timers:
  L1 SPF: Max-wait 5s Init-wait 5000ms Second-wait 5000ms
  L2 SPF: Max-wait 5s Init-wait 5000ms Second-wait 5000ms
    L1 SPF is not scheduled
    L2 SPF is not scheduled
  PSPF: Max-wait 5000ms Init-wait 2000ms Second-wait 5000ms
    PSPF is not scheduled
  LSP: max-lifetime 1200s refresh-interval 900s gen-interval 10s
    retransmit-interval 5s, lsp-interval 33ms
  SNP: csnp-interval 10s psnp-interval 2s
Global Hello Padding: Enabled
Global Hello Padding For Point to Point Circuits: Enabled
Ptpt Three Way HandShake Mechanism: Enabled
BGP Ipv4 Converged: False BGP Ipv6 Converged: False
IS-IS Traffic Engineering Support: Disabled
  No ISIS Shortcuts Configured
BFD: Disabled, BFD HoldoverInterval: 0
NSR: Disabled
LSP-SYNC: Not Globally Enabled
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show isis config

Displays the global IS-IS configuration commands that are in effect on the device.

## Syntax

```
show isis config
```

## Modes

Privileged EXEC mode

## Usage Guidelines

The running-config does not list the default values. Only commands that change a setting or add configuration information are displayed.

## Examples

The following example displays sample output from the **show isis config** command.

```
device# show isis config

router isis
 net 11.768e.f805.5812.00
 address-family ipv4 unicast
 !
 address-family ipv6 unicast
 !
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show isis counts

Displays IS-IS error statistics.

## Syntax

**show isis counts**

## Modes

Privileged EXEC mode

## Command Output

The **show isis counts** command displays the following information:

Output field	Description
Area Mismatch	The number of times the device interface was unable to create a Level-1 adjacency with a neighbor because the device interface and the neighbor did not have any areas in common.
Max Area Mismatch	The number of times the device received a PDU whose value for maximum number of area addresses did not match the device's value for maximum number of area addresses.
System ID Length Mismatch	The number of times the device received a PDU whose ID field was a different length than the ID field length configured on the device.
LSP Sequence Number Skipped	The number of times the device received an LSP with a sequence number that was more than 1 higher than the sequence number of the previous LSP received from the same neighbor.
LSP Max Sequence Number Exceeded	The number of times the device attempted to set an LSP sequence number to a value higher than the highest number in the CSNP sent by the Designated IS.
Level-1 Database Overload	The number of times the Level-1 state on the device changed from Waiting to On or from On to Waiting. <ul style="list-style-type: none"> <li>Waiting to On - This change can occur when the device recovers from a previous Level-1 LSP database overload and is again ready to receive new LSPs.</li> <li>On to Waiting - This change can occur when the device's Level-1 LSP database is full and the device receives an additional LSP, for which there is no room.</li> </ul>
Level-2 Database Overload	The number of times the Level-2 state on the device changed from Waiting to On or from On to Waiting. <ul style="list-style-type: none"> <li>The change from Waiting to On can occur when the device recovers from a previous Level-2 LSP database overload and is again ready to receive new LSPs.</li> <li>The change from On to Waiting can occur when the device's Level-2 LSP database is full and the device receives an additional LSP, for which there is no room.</li> </ul>
Our LSP Purged	The number of times the device received an LSP that was originated by the device itself and had age zero (aged out).
PDU Drop Count	



Output field	Description
CSNP Auth Failures	The number of CSNP Authentication failures recorded for Level-1 and Level-2. This counter will only be displayed if it has a value greater than zero.
PSNP Auth Failures	The number of PSNP Authentication failures recorded for Level-1 and Level-2. This counter appears only if it has a value greater than 0.
HELLO Auth Failures	The number of HELLO Authentication failures recorded for Level-1 and Level-2. This counter will only be displayed if it has a value greater than zero.
Adjacency not found	The number of PDUs dropped at both Level-1 and Level-2 because there is no valid adjacency on the interface where they were received. This counter will only be displayed if it has a value greater than zero.
Adjacency Level Mismatch	The number of PDUs dropped at both Level-1 and Level-2 because the adjacency from which the PDU is received has a different level than the PDU level. This counter will only be displayed if it has a value greater than zero.
IS Level Mismatch	The number of PDUs dropped at both Level-1 and Level-2 because the IS-IS router level mismatches with the PDU level received. This counter will only be displayed if it has a value greater than zero.
Length Too Short	The number of PDUs dropped at both Level-1 and Level-2 because the received PDU length is less than the standard PDU header length. This counter will only be displayed if it has a value greater than zero.
Length Too Long	The number of PDUs dropped at both Level-1 and Level-2 because the received PDU length is greater than the MTU of the link. This counter will only be displayed if it has a value greater than zero.
Max Area Check Failure	The number of PDUs dropped at both Level-1 and Level-2 because the received PDU has a maximum area count different than what is configured on this IS-IS router. This counter will only be displayed if it has a value greater than zero.
Zero Checksum	The number of PDUs dropped at both Level-1 and Level-2 because the received PDU has a zero checksum. This counter will only be displayed if it has a value greater than zero.
Checksum Mismatch	The number of PDUs dropped at both Level-1 and Level-2 because the received PDU has a checksum different than the computed checksum on the received PDU. This counter will only be displayed if it has a value greater than zero.
Invalid Length	The number of PDUs dropped at both Level-1 and Level-2 because the received PDU has a different length than what is advertised in the PDU header. This counter will only be displayed if it has a value greater than zero.

## Examples

The following example displays sample output from the **show isis counts** command.

```
device# show isis counts

Area Mismatch: 0
Max Area Mismatch: 0
System ID Length Mismatch: 0
LSP Sequence Number Skipped: 0
LSP Max Sequence Number Exceeded: 0
Level-1 Database Overload: 0
Level-2 Database Overload: 0
Our LSP Purged: 0
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show isis database

Displays information about the entries in the LSP database.

## Syntax

```
show isis database lsp-id
show isis database detail [ level1 | level2 ]
show isis database level1
show isis database level2
show isis database summary
```

## Parameters

<b>lsp-id</b>	Specifies a link-state packet (LSP) in HHHH.HHHH.HHHH.HH-HH format, for example, 3333.3333.3333.00-00, or by entering a name, for example, XMR.00-00.
<b>detail</b>	Specifies detailed information.
<b>level1</b>	Specifies Level 1 packets only.
<b>level2</b>	Specifies Level 2 packets only.
<b>summary</b>	Specifies summarized information.

## Modes

Privileged EXEC mode

## Command Output

The **show isis database** command displays the following information:

Output field	Description
LSPID	The LSP ID, which consists of the source ID (6 bytes), the pseudonode (1 byte), and LSPID (1 byte).  <b>NOTE</b> If the address has an asterisk ( * ) at the end, this indicates that the LSP is locally originated.
LSP Seq Num	The sequence number of the LSP.
LSP Checksum	The checksum calculated by the device that sent the LSP and used by the device to verify that the LSP was not corrupted during transmission over the network.

Output field	Description
LSP Holdtime	The maximum number of seconds during which the LSP will remain valid.  <b>NOTE</b> The IS that originates the LSP sets the timer for the LSP. As a result, LSPs do not all have the same amount of time remaining when they enter the device's LSP database.
ATT	A 4-bit value extracted from bits 4 - 7 in the Attach field of the LSP.
P	The value in the Partition option field of the LSP. The field can have one of the following values: <ul style="list-style-type: none"> <li>• 0 - The IS that sent the LSP does not support partition repair.</li> <li>• 1 - The IS that sent the LSP supports partition repair.</li> </ul>
OL	The value in the LSP database overload field of the LSP. The field can have one of the following values: <ul style="list-style-type: none"> <li>• 0 - The overload bit is off.</li> <li>• 1 - The overload bit is on, indicating that the IS that sent the LSP is overloaded and should not be used as a IS-IS transit router for that level.</li> </ul>
NLPID	The Network Layer Protocol Identifier (NLPID), which specifies the protocol the IS that sent the LSP is using. Usually, this value is "CC(IP)".
IP address	The IP address of the interface that sent the LSP. The device can use this address as the next hop in routes to the addresses listed in the rows below.
Destination addresses	The rows of information below the IP address row are the destinations advertised by the LSP. The device can reach these destinations by using the IP address listed above as the next hop.  Each destination entry contains the following information: <ul style="list-style-type: none"> <li>• Metric - The value of the default metric, which is the IS-IS cost of using the IP address above as the next hop to reach this destination.</li> <li>• Device type - The device type at the destination. The type can be one of the following: <ul style="list-style-type: none"> <li>- End System - The device is an ES.</li> <li>- IP-Internal - The device is an ES within the current area. The IP address and subnet mask are listed.</li> <li>- IS - The device is another IS. The NET (NSAP address) is listed.</li> <li>- IP-Extended - Same as IP-Internal, except the device uses the extended TLV fields described in draft-ietf-isis-traffic-02.txt to carry the information.</li> <li>- IS-Extended - Same as IS, except the device uses the extended TLV fields described in draft-ietf-isis-traffic-02.txt to carry the information.</li> </ul> </li> </ul>
Flooding to <i>num</i> interface:	Identifies the number of interfaces on which the specific LSP entry will be flooded and identifies the interfaces.
Acking to <i>num</i> interface:	Identifies the number of interfaces on which the specific LSP entry will be acknowledged and identifies the interfaces.

## Examples

The following is sample output for the **show isis database** command when no argument or keyword is used.

```
device# show isis database

IS-IS Level-1 Link State Database
LSPID                               Seq Num   Checksum  Holdtime ATT/P/OL
R1.00-00*                            0x00000030 0x163a    394      0/0/0
IS-IS Level-2 Link State Database
LSPID                               Seq Num   Checksum  Holdtime ATT/P/OL
R1.00-00*                            0x00000030 0xc865    394      0/0/0
```

The following is sample output for the **show isis database** command when the **detail** keyword is used.

```
device# show isis database detail

IS-IS Level-1 Link State Database
LSPID                               Seq Num   Checksum  Holdtime ATT/P/OL
R1.00-00*                            0x00000038 0x0642    1095     0/0/0
  Area Address: 11
  NLPID: IP
  Hostname: R1
  Metric: 10      IP-Internal 1.2.3.4/32      Up: 0
  Metric: 10      IP-Internal 11.2.1.16/30   Up: 0
  Metric: 10      IP-Internal 11.2.1.0/30    Up: 0
  Metric: 10      IP-Internal 11.2.1.8/30    Up: 0
  Metric: 10      IP-Internal 11.2.1.4/30    Up: 0
  Metric: 10      IP-Internal 11.2.1.12/30   Up: 0
  Metric: 10      IP-Internal 11.2.1.24/30   Up: 0
  Metric: 10      IP-Internal 11.2.1.20/30   Up: 0
  Metric: 10      IP-Internal 11.2.1.32/30   Up: 0
  Metric: 10      IP-Internal 11.2.1.28/30   Up: 0
  Metric: 10      IP-Internal 11.2.1.36/30   Up: 0
  Metric: 10      IS 76:8e:f8:5:58:12. 2
  Metric: 10      IS 76:8e:f8:5:58:12. 3
  Metric: 10      IS 76:8e:f8:5:58:12. 4
  Metric: 10      IS 76:8e:f8:5:58:12. 5
  Metric: 10      IS 76:8e:f8:5:58:12. 6
  Metric: 10      IS 76:8e:f8:5:58:12. 7
  ...
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show isis hostname

Displays the router-name-to-system-ID mapping table entries for an IS-IS device.

## Syntax

`show isis hostname`

## Modes

Privileged EXEC mode

## Examples

The following example displays sample output from the `show isis hostname` command.

```
device# show isis hostname

Total number of entries in IS-IS Hostname Table: 1
System ID      Hostname      * = local IS
-----
* 768e.f805.5812  R1
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show isis interface

Displays information about IS-IS interfaces for a device.

## Syntax

**show isis interface**

**show isis interface brief**

**show isis interface ethernet** *slot/port*

**show isis interface loopback** *number*

**show isis interface ve** *vlan\_id*

## Parameters

**brief**

Specifies a brief summary of IP interface IS-IS interface information.

**ethernet** *slot / port*

Specifies an Ethernet slot and port.

**loopback** *number*

Specifies a loopback interface. Valid values range from 1 through 255.

**ve** *vlan\_id*

Specifies a virtual Ethernet (VE) interface. Valid values range from 1 through 4096.

## Modes

Privileged EXEC mode

## Command Output

The **show isis interface** command displays the following information:

Output field	Description
Total number of IS-IS interfaces	The number of interfaces on which IS-IS is enabled.
Interface	The port or virtual interface number to which the information listed below applies.
Circuit State	The state of the circuit, which can be one of the following: <ul style="list-style-type: none"> <li>DOWN</li> <li>UP</li> </ul>
Circuit Mode	The IS-IS type in use on the circuit. The mode can be one of the following: <ul style="list-style-type: none"> <li>LEVEL-1</li> <li>LEVEL-2</li> <li>LEVEL-1-2</li> </ul>

Output field	Description
Circuit Type	The type of IS-IS circuit running on the interface. The circuit type can be one of the following: <ul style="list-style-type: none"> <li>• BCAST (broadcast).</li> <li>• PTP (Point-to-Point)</li> </ul>
Passive State	The passive state determines whether the interface is allowed to form an IS-IS adjacency with the IS at the other end of the circuit. The state can be one of the following: <ul style="list-style-type: none"> <li>• FALSE - The passive option is disabled. The interface can form an adjacency with the IS at the other end of the link.</li> <li>• TRUE - The passive option is enabled. The interface cannot form an adjacency, but can still advertise itself into the area.</li> </ul>
Circuit Number	The ID that the instance of IS-IS running on the interface applied to the circuit between this interface and the interface at the other end of the link.
MTU	The maximum length supported for IS-IS PDUs sent on this interface.
Level-1 Auth-mode	One of the following authentication modes set for Level-1 on the router: <ul style="list-style-type: none"> <li>• None</li> <li>• md5</li> <li>• cleartext</li> </ul>
Level-2 Auth-mode	One of the following authentication modes set for Level-2 on the router: <ul style="list-style-type: none"> <li>• None</li> <li>• md5</li> <li>• cleartext</li> </ul> <p>This parameter is not displayed for interfaces that are configured with a Point-to-Point circuit type. This is because separate Level-2 Hello messages are not sent on Point-to-Point interfaces. Consequently, "Hello Interval", "Hello Multiplier", and "Authentication" parameters should always be configured in the Level-1 mode for Point-to-Point interfaces.</p>
Level-1 Metric	The default-metric value that the device inserts in IS-IS Level-1 PDUs for this interface.
Level-1 Priority	The priority of this IS to be elected as the Designated IS for Level-1 in this broadcast network.
Level-1 Hello Interval	The number of seconds the software waits between sending Level-1 hello PDUs to the IS at the other end of the circuit.
Level-1 Hello Multiplier	The number by which the software multiplies the hello interval to calculate the hold time set in Level-1 Hello PDUs sent on the circuit.
Level-1 Designated IS	The NET of the Level-1 Designated IS.
Level-1 DIS Changes	The number of times the NET of the Level-1 Designated IS has changed.
Level-2 Metric	The default-metric value that the device inserts in IS-IS Level-2 PDUs for this interface.
Level-2 Priority	The priority of this IS to be elected as the Designated IS for Level-2 in this broadcast network.
Level-2 Hello Interval	The number of seconds the software waits between sending Level-2 Hello messages to the IS at the other end of the circuit.



Output field	Description
Level-2 Hello Multiplier	<p>The number by which the software multiplies the hello interval to calculate the hold time set for Level-2 Hello PDUs sent on this circuit.</p> <p>This parameter is not displayed for interfaces that are configured with a Point-to-Point circuit type. This is because separate Level-2 Hello messages are not sent on Point-to-Point interfaces. Consequently, "Hello Interval", "Hello Multiplier", and "Authentication" parameters should always be configured in the Level-1 mode for Point-to-Point interfaces.</p>
Level-2 Designated IS	The NET of the Level-2 Designated IS.
Level-2 DIS Changes	The number of times the NET of the Level-2 Designated IS has changed.
Next IS-IS LAN Level-1 Hello	Number of seconds before next Level-1 Hello PDU will be transmitted by the device.
Next IS-IS LAN Level-2 Hello	Number of seconds before next Level-2 Hello PDU will be transmitted by the device.
Number of active Level-1 adjacencies	The number of ISs with which this interface has an active Level-1 adjacency.
Number of active Level-2 adjacencies	The number of ISs with which this interface has an active Level-2 adjacency.
Circuit State Changes	The number of times the state of the circuit has changed.
Circuit State Adjacencies Changes	The number of times an adjacency has started or ended on this circuit.
Rejected Adjacencies	The number of adjacency attempts by other ISs rejected by the device.
Circuit Authentication L1 failures	The number of times the device rejected a circuit because the authentication did not match the authentication configured for Level 1 on the device.
Circuit Authentication L2 failures	<p>The number of times the device rejected a circuit because the authentication did not match the authentication configured for Level 2 on the device.</p> <p>This parameter is not displayed for interfaces that are configured with a Point-to-Point circuit type. This is because separate Level-2 Hello messages are not sent on Point-to-Point interfaces. Consequently, "Hello Interval", "Hello Multiplier", and "Authentication" parameters should always be configured in the Level-1 mode for Point-to-Point interfaces.</p>
Bad LSP	<p>The number of times the interface received a bad LSP from an IS at the other end of the circuit. The following conditions can cause an LSP to be bad:</p> <ul style="list-style-type: none"> <li>• Invalid checksum</li> <li>• Invalid length</li> <li>• Invalid lifetime value</li> </ul>
Control Messages Sent	The number of IS-IS control PDUs sent on this interface.
Control Messages Received	The number of IS-IS control PDUs received on this interface.
Hello Padding:	<p>The Hello Padding configuration, which can be:</p> <ul style="list-style-type: none"> <li>• Enabled</li> <li>• Disabled</li> </ul>
IP Enabled	If set to TRUE, the IP protocol is enabled for this circuit.
IP Address and Subnet Mask	The IP address and subnet mask for this interface.

show isis interface

Output field	Description
IPv6 Enabled	If set to TRUE, the IPv6 protocol is enabled for this circuit.
IPv6 Address and Subnet Mask	The IPv6 address and subnet mask for this interface.
IPv6 Link-Local Addresses	The IPv6 link local address for this interface.
MPLS TE Enabled:	If set to TRUE, MPLS Traffic Engineering protocol is enabled for this circuit.
BFD Enabled:	If set to TRUE, BiDirectional Forwarding Detection is enabled for this circuit.

## Examples

The following example displays information about IS-IS interfaces for a device.

```

device# show isis interface
Total number of IS-IS Interfaces: 11

Interface: Ve 301
  Circuit State: UP Circuit Mode: Level 1-2
  Circuit Type: BCAST Passive State: FALSE
  Circuit Number: 2, MTU: 1500
  Level-1 Auth-mode: NONE
  Level-2 Auth-mode: NONE
  Level-1 Metric: 10, Level-1 Priority: 64
  Level-1 Hello Interval: 10, Level-1 Hello Multiplier: 3
  Level-1 Designated IS: R1-02 Level-1 DIS Changes: 2
  Level-2 Metric: 10, Level-2 Priority: 64
  Level-2 Hello Interval: 10, Level-2 Hello Multiplier: 3
  Level-2 Designated IS: R1-02 Level-2 DIS Changes: 2
  Next IS-IS LAN Level-2 Hello in 11 seconds
  Number of active Level-2 adjacencies: 0
  Next IS-IS LAN Level-1 Hello in 1 seconds
  Number of active Level-1 adjacencies: 0
  Circuit State Changes: 1 Circuit Adjacencies State Changes: 0
  Rejected Adjacencies: 0
  Circuit Authentication L1 failures: 0
  Circuit Authentication L2 failures: 0
  Bad LSPs: 0
  Control Messages Sent: 7577 Control Messages Received: 0
  Hello Padding: Enabled
  IP Enabled: TRUE
  IP Addresses:
    11.2.1.1/30
  IPv6 Enabled: FALSE
  MPLS TE Enabled: FALSE
  BFD Enabled: FALSE
  LDP-SYNC: Disabled, State:

Interface: Ve 302
  Circuit State: UP Circuit Mode: Level 1-2
  Circuit Type: BCAST Passive State: FALSE
  Circuit Number: 3, MTU: 1500
  Level-1 Auth-mode: NONE
  Level-2 Auth-mode: NONE
  Level-1 Metric: 10, Level-1 Priority: 64
  Level-1 Hello Interval: 10, Level-1 Hello Multiplier: 3
  Level-1 Designated IS: R1-03 Level-1 DIS Changes: 2
  Level-2 Metric: 10, Level-2 Priority: 64
  Level-2 Hello Interval: 10, Level-2 Hello Multiplier: 3
  Level-2 Designated IS: R1-03 Level-2 DIS Changes: 2
  Next IS-IS LAN Level-2 Hello in 2 seconds
  Number of active Level-2 adjacencies: 0
  Next IS-IS LAN Level-1 Hello in 4 seconds
  Number of active Level-1 adjacencies: 0
  Circuit State Changes: 1 Circuit Adjacencies State Changes: 0
  Rejected Adjacencies: 0
  Circuit Authentication L1 failures: 0
  Circuit Authentication L2 failures: 0
  Bad LSPs: 0
  Control Messages Sent: 7600 Control Messages Received: 0
  Hello Padding: Enabled
  IP Enabled: TRUE
  IP Addresses:
    11.2.1.5/30
  IPv6 Enabled: FALSE
  MPLS TE Enabled: FALSE
  BFD Enabled: FALSE
  LDP-SYNC: Disabled, State:
...

```

show isis interface

The following example displays summarized information about IS-IS interfaces for a device.

```
device# show isis interface brief
```

```
Total number of IS-IS Interfaces: 11
Interface      Type  State Mode Passive MTU  UpAdj DIS  StateChg  AdjStateChg
Ve 301         BCAST UP   L12  FALSE  1500 0    None 1      0
Ve 302         BCAST UP   L12  FALSE  1500 0    None 1      0
Ve 303         BCAST UP   L12  FALSE  1500 0    None 1      0
Ve 304         BCAST UP   L12  FALSE  1500 0    None 1      0
Ve 305         BCAST UP   L12  FALSE  1500 0    None 1      0
Ve 306         BCAST UP   L12  FALSE  1500 0    None 1      0
Ve 307         BCAST UP   L12  FALSE  1500 0    None 1      0
Ve 308         BCAST UP   L12  FALSE  1500 0    None 1      0
Ve 309         BCAST UP   L12  FALSE  1500 0    None 1      0
Ve 310         BCAST UP   L12  FALSE  1500 0    None 1      0
Lo 1           BCAST UP   L12  TRUE   0     0    None 1      0
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show isis neighbors

Displays IS-IS neighbor information.

## Syntax

```
show isis neighbor [ detail ]
```

## Parameters

**detail**

Specifies detailed information.

## Modes

Privileged EXEC mode

## Command Output

The **show isis neighbors** command displays the following information:

Output field	Description
Total number of IS-IS Neighbors	The number of ISs with which the device has formed IS-IS adjacencies.
System ID	The System ID of the neighbor or the hostname of the neighbor.
Interface	The device port or virtual interface attached to the neighbor.
SNPA	The Subnetwork Point of Attachment (SNPA), which is the MAC address of the device port or virtual interface attached to the neighbor.
State	The state of the adjacency with the neighbor. The state can be one of the following: <ul style="list-style-type: none"> <li>DOWN - The adjacency is down.</li> <li>INIT - The adjacency is being established and is not up yet.</li> <li>UP - The adjacency is up.</li> </ul>
Holdtime	The neighbor's advertised hold time.
Type	The IS-IS type of the adjacency. The type can be one of the following: <ul style="list-style-type: none"> <li>ISL1 - Level-1 IS</li> <li>ISL2 - Level-2 IS</li> <li>ES - ES</li> </ul> <p><b>NOTE</b> The device forms a separate adjacency for each IS-IS type. Thus, if the device has both types of IS-IS adjacencies with the neighbor, the display contains a separate row of information for each adjacency.</p>
Pri	The priority of this IS to be elected as the Designated IS in this broadcast network.

Output field	Description
StateChgeTime	The amount of time that has passed since the adjacency last changed state.
Protocol	The routing protocol supported by the neighbor. The protocol can be one of the following: <ul style="list-style-type: none"> <li>• MT-ISIS - Multi-Topology is enabled on the neighbor.</li> <li>• ISIS - Multi-Topology is not enabled on the neighbor.</li> </ul>

The **show isis neighbors detail** command displays the following information:

Output field	Description
Total number of IS-IS Neighbors	The number of ISs with which the device has formed IS-IS adjacencies.
System ID	The System ID of the neighbor or the hostname of the neighbor.
Interface	The device port or virtual interface attached to the neighbor.
SNPA	The Subnetwork Point of Attachment (SNPA), which is the MAC address of the device port or virtual interface attached to the neighbor.
State	The state of the adjacency with the neighbor. The state can be one of the following: <ul style="list-style-type: none"> <li>• DOWN - The adjacency is down.</li> <li>• INIT - The adjacency is being established and is not up yet.</li> <li>• UP - The adjacency is up.</li> </ul>
Holdtime	The neighbor's advertised hold time.
Type	The IS-IS type of the adjacency. The type can be one of the following: <ul style="list-style-type: none"> <li>• ISL1 - Level-1 IS</li> <li>• ISL2 - Level-2 IS</li> <li>• ES - ES</li> </ul> <p><b>NOTE</b> The device forms a separate adjacency for each IS-IS type. Thus, if the device has both types of IS-IS adjacencies with the neighbor, the display contains a separate row of information for each adjacency.</p>
Pri	The priority of this IS to be elected as the Designated IS in this broadcast network.
StateChgeTime	The amount of time that has passed since the adjacency last changed state.
3-Way Handshake TLV received	The received 3-way handshake TLV for the interface.
Area Address (es)	The address of the area.
Protocols Supported	The topology supported by the neighbor.
IP Address	The IP address assigned to the neighbor interface.
Adj Usage L1	The adjacency level used by the neighbor.
circuit ID	The ID of the IS-IS circuit running on the neighbor interface.
Protocol	The routing protocol supported by the neighbor. The protocol can be one of the following: <ul style="list-style-type: none"> <li>• MT-ISIS - Multi-Topology is enabled on the neighbor.</li> <li>• ISIS- Multi-Topology is not enabled on the neighbor.</li> </ul>

## Examples

The following example displays information about IS-IS neighbors.

```
device# show isis neighbors
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show isis routes

Displays the routes in the IS-IS route table.

## Syntax

```
show isis routes [ ip-address subnet-mask | ip-address/prefix ]
```

## Parameters

*ip-address subnet-mask*

Specifies an IP address and network mask.

*ip-address/prefix*

Specifies an IP address and prefix.

## Modes

Privileged EXEC mode

## Command Output

The **show isis routes** command displays the following information:

Output field	Description
Total number of IS-IS routes	The total number of routes in the device's IS-IS route table. The total includes Level-1 and Level-2 routes.
Destination	The IP destination of the route.
Mask	The subnet mask for the destination address.
Cost	The IS-IS default metric for the route, which is the cost of using this route to reach the next-hop router to this destination.
Type	The route type, which can be one of the following: <ul style="list-style-type: none"> <li>• L1 - Level-1 route</li> <li>• L2 - Level-2 route</li> </ul>
Tag	The tag value associated with the route.
Path	The path number in the table. The IS-IS route table can contain multiple equal-cost paths to the same destination, in which case the paths are numbered consecutively. When IP load sharing is enabled, the device can load balance traffic to the destination across the multiple paths.
Next Hop IP	The IP address of the next-hop interface to the destination.
Interface	The device interface (port or virtual interface) attached to the next hop.
Flags	Values used by technical support for troubleshooting.



## Examples

The following is sample output for the **show isis routes** command when no argument or keyword is used.

```
device# show isis routes
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show isis spf-log

Displays IS-IS link-state packet (LSP) logging information.

## Syntax

```
show isis spf-log
```

```
show isis spf-log detail
```

```
show isis spf-log level-1 [detail ]
```

```
show isis spf-log level-2 [detail ]
```

## Parameters

**detail**

Specifies detailed information.

**level-1**

Specifies Level 1 packets only.

**level-2**

Specifies Level 2 packets only.

## Modes

Privileged EXEC mode

## Command Output

The **show isis spf-log** command displays the following information:

Output field	Description
When	When (in hours: minutes : seconds) a full SPF calculation occurred. The last 20 occurrences are logged.
Duration	The time required to complete this SPF run. Elapsed time is normal clock time (not CPU time). Other options for this field are: <ul style="list-style-type: none"> <li>Running - the SPF is still running and the duration will be updated after the SFP has run.</li> <li>Pending - the event is pending and another SPF will be run once the currently executing SPF has completed.</li> </ul>
Nodes	The number of routers and pseudonodes (LANs) that make up the topology calculated in this SPF run.
Count	The number of events that triggered this SPF run. When a topology change has occurred, multiple link-state packets (LSPs) are received in a short time. Since a router waits about 5 seconds before running a full SPF run, it can include all new information. This count includes the number of events (such as receiving new LSPs) that occurred while the router was waiting the 5 second interval before running full SPF.

Output field	Description
Last Trigger LSP	When a full SPF calculation is triggered by the arrival of a new LSP, the router stores the LSP ID. The LSP ID can provide a clue about the source of routing instability in an area. If multiple LSPs in a single level are causing SPF runs, only the LSP ID of the last received LSP is recorded.
Triggers	The reason that a full SPF calculations was triggered.
Alternate Route Check	PSPF deleted an IPv4 or IPv6 route. Full SPF must run to find the alternate route.
Route Change in L1 SPF Run	The L1 SPF run added or deleted an IPv4 or IPv6 route. The L2 SPF must run to accommodate this change.
LSP Purged	An LSP was purged. A full SPF calculation must process this change.
LSP Added	A new LSP has appeared in the database. A full SPF calculation is needed to process this new LSP.
Summary Address Change	A summary address configuration change has occurred.
Adjacency State Change	An adjacency was added or deleted.
Admin Distance Change	The administrative distance configuration has changed.
LSP Header Change	The LSP header (attached or overload bits) is changed.
IS Neighbor TLV Change	An IS neighbor TLV was added or deleted in an LSP.
Area Address TLV Change	The area address TLV changed.
Interface IP Address Change	The IP address configuration changed.
IP Address TLV Change	An IP address TLV changed in the LSP.
IPv6 Address TLV Change	An IPv6 address TLV changed in the LSP.
IS-IS Level Change	The IS-IS level configuration changed.
Interface Metric Change	The IS-IS interface metric configuration changed.
LSP Changed - PSPF Disabled	The LSP changed and PSPF is disabled.
LSP Overload Bit Change	The overload bit in the LSP header changed.
Interface State Change	The interface state changed to up or down.
Redist Prefix-List Change	The redistribution list configuration changed.
Redist Policy Change	The redistribution policy configuration changed.
Maximum Path Change	The IS-IS maximum path configuration changed.
IP Load Sharing Change	The IP load sharing configuration changed.
User Cleared IS-IS Route	The user cleared a specific IS-IS route.
User Cleared IS-IS Routes	The user cleared all IS-IS routes.
Neighbor NLPID Change	NLPID set is changed in received hellos.
ISIS Enable	IS-IS was enabled.
ISTCT_SPF Computation	The user issued the <b>disable-incremental-stct-spf-opt</b> command.
User Cleared IS-IS All	The user issued the <b>clear isis all</b> command.
Interface Config Change	ISIS was enabled or disabled on a port.
User Trigger	The user issued the <b>clear isis spf-trigger</b> command.
Recompute InterLeve Routes	The neighbor IS-type is changed either from L1 to L12 or L12 to L1
Exited Overload State	IS-IS exited from an overload condition.

## Examples

The following is sample output for the **show isis spf-log** command.

```
device# show isis spf-log
ISIS Level-1 SPF Log
  When      Duration Nodes Count Last-Trigger-LSP      Trigger
  10h34m13s 0ms      1    10   R1.00-00             Interface State Change
  10h34m38s 0ms      1    2    R1.00-00             Interface Config Change
  10h34m43s 0ms      1    18   R1.00-00             Interface Config Change
  10h34m48s 0ms      1    5    R1.00-00             Interface State Change
ISIS Level-2 SPF Log
  When      Duration Nodes Count Last-Trigger-LSP      Trigger
  10h34m13s 0ms      1    10   R1.00-00             Interface State Change
  10h34m38s 0ms      1    2    R1.00-00             Interface Config Change
  10h34m43s 0ms      1    18   R1.00-00             Interface Config Change
  10h34m48s 0ms      1    5    R1.00-00             Interface State Change
```

The following is sample output for the **show isis spf-log** command when the **detail** keyword is used.

```
device# show isis spf-log detail

ISIS Level-1 SPF Log
  When      Duration Nodes Count Last-Trigger-LSP      Trigger
  12h18m45s 0ms      1    10   R1.00-00             Interface State Change
  Ipv4 Route updates: 0 Ipv6 Route updates: 0
    First Trigger: 12h18m50s Ve 305 State Changed to Up
  12h19m10s 0ms      1    2    R1.00-00             Interface Config Change
  Ipv4 Route updates: 0 Ipv6 Route updates: 0
    First Trigger: 12h19m15s Ve 310 State Changed to Down
  12h19m15s 0ms      1    18   R1.00-00             Interface Config Change
  Ipv4 Route updates: 0 Ipv6 Route updates: 0
    First Trigger: 12h19m18s Ve 301 State Changed to Down
  12h19m20s 0ms      1    5    R1.00-00             Interface State Change
  Ipv4 Route updates: 0 Ipv6 Route updates: 0
    First Trigger: 12h19m25s LSP R1.00-00 Area Address TLV Changed
ISIS Level-2 SPF Log
  When      Duration Nodes Count Last-Trigger-LSP      Trigger
  12h18m45s 0ms      1    10   R1.00-00             Interface State Change
  Ipv4 Route updates: 0 Ipv6 Route updates: 0
    First Trigger: 12h18m50s Ve 305 State Changed to Up
  12h19m10s 0ms      1    2    R1.00-00             Interface Config Change
  Ipv4 Route updates: 0 Ipv6 Route updates: 0
    First Trigger: 12h19m15s Ve 310 State Changed to Down
  12h19m15s 0ms      1    18   R1.00-00             Interface Config Change
  Ipv4 Route updates: 0 Ipv6 Route updates: 0
    First Trigger: 12h19m18s Ve 301 State Changed to Down
  12h19m20s 0ms      1    5    R1.00-00             Interface State Change
...
```

The following is sample output for the **show isis spf-log** command when the **level-1** keyword is used.

```
device# show isis spf-log level-1
ISIS Level-1 SPF Log
  When      Duration Nodes Count Last-Trigger-LSP      Trigger
  12h19m40s 0ms      1    10   R1.00-00             Interface State Change
  12h20m5s 0ms      1    2    R1.00-00             Interface Config Change
  12h20m10s 0ms      1    18   R1.00-00             Interface Config Change
  12h20m15s 0ms      1    5    R1.00-00             Interface State Change
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show isis traffic

Displays information about IS-IS packet counts.

## Syntax

```
show isis traffic
```

## Modes

Privileged EXEC mode

## Command Output

The **show isis traffic** command displays the following information:

Output field	Description
Level-1 Hellos	The number of Level-1 hello PDUs sent and received by the device.
Level-2 Hellos	The number of Level-2 hello PDUs sent and received by the device.
Level-1 LSP	The number of Level-1 link-state PDUs sent and received by the device.
Level-2 LSP	The number of Level-2 link-state PDUs sent and received by the device.
Level-1 CSNP	The number of Level-1 Complete Sequence Number PDUs (CSNPs) sent and received by the device.
Level-2 CSNP	The number of Level-2 CSNPs sent and received by the device.
Level-1 PSNP	The number of Level-1 Partial Sequence Number PDUs (PSNPs) sent and received by the device.
Level-2 PSNP	The number of Level-2 PSNPs sent and received by the device.

## Examples

The following is sample output for the **show isis traffic** command.

```
device# show isis traffic

Level-1 Hellos           Message Received   Message Sent
Level-2 Hellos           0                  44912
PTP Hellos                0                  44927
Level-1 LSP               0                  0
Level-2 LSP               0                  0
Level-1 CSNP              0                  0
Level-2 CSNP              0                  0
Level-1 PSNP              0                  0
Level-2 PSNP              0                  0
```

show isis traffic

## History

Release version	Command history
16r.1.00	This command was introduced.

# Show J through Show Z

---

## show lacp

Displays Link Aggregation Control Protocol (LACP) statistics.

### Syntax

```
show lacp [ counters [ port-channel ] | sys-id [ port-channel ]
```

### Parameters

#### counters

Displays LACP statistics for all port-channel interfaces.

#### *port-channel*

Displays counters for a specified port channel interface. Valid values range from 1 through 6144.

#### sys-id

Displays LACP statistics by system ID.

### Modes

Privileged EXEC mode

### Usage Guidelines

Use this command to display the LACP statistics for each port-channel interface for all port-channel interfaces or a single port-channel interface, or by system ID.

### Examples

To display the local system ID:

```
switch# show lacp sys-id
% System 8000,00-05-1e-76-1a-a6
```

### History

Release version	Command history
16r.1.00	This command was introduced.

# show latch-detection

Displays latch detection configuration information.

## Syntax

```
show latch-detection [ linecard linecard-id ]
```

## Parameters

**linecard** *linecard-id*

Specifies a line card ID. On the SLX 9850-4 platform, the range is from 1 through 4. On the SLX 9850-8 platform, the range is from 1 through 8.

## Modes

Privileged EXEC mode

## Usage Guidelines

Executing the **show latch-detection** command without specifying a line card ID displays latch detection configuration information for all linecards.

### NOTE

Some older line cards do not support latch detection and the latch detection configuration on these cards is always disabled.

## Command Output

The **show latch-detection** command displays the following information:

Output field	Description
slot	Slot.
Module Type	Module type. Latch detection is supported on module types 72X10G (Version 6 and above) and 36X100G (Version 4 and above).
Ver	Version of the line card.
Latch(L)	Status of the left latch screw (CLOSED or OPEN).
Latch(R)	Status of the right latch screw (CLOSED or OPEN).
Config In-Use	Latch detection configuration (stored on the line card) that is currently in use. This configuration is set during device startup or line card reset.
New Config	Latch detection configuration in the system that is set by using the <b>latch-detection</b> command. This configuration takes effect after the next system reboot.
Enforce	Enforce status (YES or NO) determines whether a line card with loosened latch screws is enabled on bootup. When the Enforce status is YES and a latch screw is not properly installed, the line card is set to unlatched mode (executing the <b>show slots</b> command returns a Status of VACANT@). When the Enforce status is NO, the line card comes up irrespective of the latch screw status. The current latch detection configuration (Config In-Use), module type, and version determine the Enforce status.



## Examples

The following example displays latch detection configuration information for line card 1.

```
device# show latch-detection linecard 1
```

slot	Module Type	Ver	Latch(L)	Latch(R)	Config In-Use	New Config	Enforce
LC1	36X100G	4	CLOSED	CLOSED	ENABLE	DISABLE	YES

## History

Release version	Command history
17r.1.01	This command was introduced.

# show license

Displays license information.

## Syntax

```
show license [ eula | id ]
```

## Command Default

Displays the licenses installed on the local switch.

## Parameters

**eula**

Specifies the EULA statement.

**id**

Specifies the license ID and information.

## Modes

Privileged EXEC mode

## Usage Guidelines

Use this command to display general license information, the license ID, and the EULA text.

The EULA text can be displayed using the **show license eula** command.

## Examples

The following example displays the EULA text.

```
device# show license eula
Use of the features enabled via the "license eula accept" CLI requires a license to
be purchased within 30 days. By accepting the EULA you indicate that you
have read and accept the Brocade End User License Agreement found at the following URL.
[www.brocade.com/en/legal/software-terms-eulas/brocade-network-operating-system.html].
```

The following example displays the SAU license when the EULA is accepted.

```
device# show license
Chassis:
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
Advanced Features license
Feature name:ADVANCED_FEATURES
License is Trust Based
EULA acceptance date: Thu Nov 24 23:58:11 2016
```

The following example displays the switch license ID. Use the chassis license ID when ordering new licenses for SLX 9540 devices. Use the license ID of each LC, and not the chassis when ordering new licenses for SLX 9850 devices.

```
device# show license id
Location                               License ID
=====
Chassis                                10:00:00:27:F8:E0:FF:EA
Slot L1                                10:00:C4:F5:7C:50:00:71
Slot L8                                10:00:02:60:69:00:00:01
```

The following example displays the **show license** command output when there is no licenses installed on the chassis.

```
device# show license

Slot:3
No entries available
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# show link-oam info

Displays the link OAM information.

## Syntax

```
show link-oam info
```

## Modes

User EXEC mode

## Command Output

The **show link-oam info** command displays the following information:

Output field	Description
Ethernet Port	Indicates the ethernet port where the EFM-OAM is enabled.
Link Status	Indicates whether the physical link is operational (up) or has any fault (down).
OAM Status	Indicates the status of OAM on the link between the local and remote DTEs. The status is enabled if the OAM client is satisfied with the local and remote settings.
Mode	Indicates whether the DTE is in active or passive modes. Active DTEs can start the discovery process and passive DTEs can only respond.
Local Stable	Indicates the reception of the remote DTE state information and is satisfied with the remote OAM settings.
Remote Stable	Indicates the reception of the local DTE state information at the remote DTE and is satisfied with the local OAM settings.

## Examples

The following example displays sample output from the **show link-oam info** command.

```
device#show link-oam info
Ethernet Link Status    OAM Status    Mode    Local Stable    Remote Stable
1/1      up            up           active    satisfied      satisfied
1/2      up            up           passive   satisfied      satisfied
1/3      up            up           active    satisfied      satisfied
1/4      up            init         passive   unsatisfied   unsatisfied
1/5      down         down         passive   unsatisfied   unsatisfied
1/6      down         down         passive   unsatisfied   unsatisfied
1/7      down         down         passive   unsatisfied   unsatisfied
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# show link-oam info detail

Displays the detailed dump of the link OAM internal state for all ports.

## Syntax

```
show link-oam info detail
```

## Modes

Privileged EXEC mode

## Command Output

The **show link-oam info detail** command displays the following information:

Output field	Description
Local information	Displays the local information.
Remote information	Displays the remote information.

## Examples

This example displays the detailed dump of Link OAM statistics for all ports:

```
device# show link-oam info detail
OAM information for Ethernet port: 2/1
+link-oam mode:      active
+link status:        up
+oam status:         init
Local information
  multiplexer action: forward
  parse action:      forward
  stable:            unsatisfied
  state:            activeSend
  dying-gasp:       false
  critical-event:   false
  link-fault:       false
Remote information
  multiplexer action: forward
  parse action:      forward
  stable:            unsatisfied
  dying-gasp:       false
  critical-event:   false
  link-fault:       false

OAM information for Ethernet port: 2/2
+link-oam mode:      passive
+link status:        down
+oam status:         init
Local information
  multiplexer action: forward
  parse action:      forward
  stable:            unsatisfied
  state:            down
  dying-gasp:       false
  critical-event:   false
  link-fault:       false
Remote information
  multiplexer action: forward
  parse action:      forward
  stable:            unsatisfied
  dying-gasp:       false
  critical-event:   false
  link-fault:       false
```

## History

Release version	Command history
17r.1.01	This command was introduced.

# show link-oam statistics

Display the link OAM statistics.

## Syntax

**show link-oam statistics**

## Modes

User EXEC mode

## Command Output

The **show link-oam statistics** command displays the following information:

Output field	Description
Ethernet Port	Indicates the ethernet port where the EFM-OAM is enabled.
Tx PDUs	Indicates the number of PDUs transmitted.
Rx PDUs	Indicates the number of PDUs received.

## Examples

The following example displays sample output from the **show link-oam statistics** command.

```
device# show link-oam statistics
Ethernet Tx PDUs    Rx PDUs
2/1                93      92
2/2                45      46
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# show link-oam statistics detail

Displays the detailed dump of Link OAM statistics for all ports.

## Syntax

`show link-oam statistics detail`

## Modes

Privileged EXEC mode

## Command Output

The `show link-oam statistics detail` command displays the following information:

Output field	Description
Tx statistics	Details the data transmitted.
Rx statistics	Details the date received.



## Examples

This example displays the detailed dump of Link OAM statistics for all ports:

```

device# show link-oam statistics detail
OAM statistics for Ethernet port: 1/1
  Tx statistics
    information OAMPDUs:                587
    loopback control OAMPDUs:           0
    variable request OAMPDUs:           0
    variable response OAMPDUs:          0
    unique event notification OAMPDUs:  0
    duplicate event notification OAMPDUs: 0
    organization specific OAMPDUs:      0
    link-fault records:                  0
    critical-event records:              0
    dying-gasp records:                  0
  Rx statistics
    information OAMPDUs:                442
    loopback control OAMPDUs:           0
    variable request OAMPDUs:           0
    variable response OAMPDUs:          0
    unique event notification OAMPDUs:  0
    duplicate event notification OAMPDUs: 0
    organization specific OAMPDUs:      0
    unsupported OAMPDUs:                 0
    link-fault records:                  0
    critical-event records:              0
    dying-gasp records:                  0
    discarded TLVs:                      0
    unrecognized TLVs:                   0
OAM statistics for Ethernet port: 1/2
  Tx statistics
    information OAMPDUs:                440
    loopback control OAMPDUs:           0
    variable request OAMPDUs:           0
    variable response OAMPDUs:          0
    unique event notification OAMPDUs:  0
    duplicate event notification OAMPDUs: 0
    organization specific OAMPDUs:      0
    link-fault records:                  0
    critical-event records:              0
    dying-gasp records:                  0
  Rx statistics
    information OAMPDUs:                441
    loopback control OAMPDUs:           0
    variable request OAMPDUs:           0
    variable response OAMPDUs:          0
    unique event notification OAMPDUs:  0
    duplicate event notification OAMPDUs: 0
    organization specific OAMPDUs:      0
    unsupported OAMPDUs:                 0
    link-fault records:                  0
    critical-event records:              0
    dying-gasp records:                  0
    discarded TLVs:                      0
    unrecognized TLVs:                   0

```

## History

Release version	Command history
17r.1.01	This command was introduced.

# show lldp interface

Displays the LLDP status on the specified interface.

## Syntax

```
show lldp interface [ ethernet slot/port ]
```

## Parameters

### **ethernet**

Use this parameter to specify an Ethernet interface, followed by the slot or port number.

### *slot*

Specifies a valid slot number.

### *port*

Specifies a valid port number.

## Modes

Privileged EXEC mode

## Usage Guidelines

If the **ethernet** *slot/port* parameter is not specified, this command displays the LLDP status information received on all the interfaces.

## Examples

To display all the LLDP ethernet interface information, enter the following:

```
device# show lldp interface ethernet ?
Description: The list of Ethernet interfaces.
Possible completions:
 1/1
 1/2
 1/3
 1/4
 1/5
 1/6
 1/8
 1/9
 1/10
 1/11
 1/12
 1/13
 1/14
 1/15
 1/16
 1/17
 1/18
 1/19
 1/20
 1/21
 1/22
 1/23
```

To display the LLDP interface information for a specified ethernet interface, enter the following:

```
device# show lldp interface ethernet 1/18
LLDP information for Eth 1/18
  State:                Enabled
  Mode:                 Receive/Transmit
  Advertise Transmitted: 30 seconds
  Hold time for advertise: 120 seconds
  Tx Delay Timer:      1 seconds
  Transmit TLVs:       Chassis ID          Port ID
                       TTL                Port Description
                       System Name
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show lldp neighbors

Displays LLDP information for all neighboring devices on the specified interface.

## Syntax

```
show lldp neighbors [ interface [ethernet slot/port ]] [detail]
```

## Parameters

### ethernet

Use this parameter to specify an Ethernet interface, followed by the slot or port number.

### slot

Specifies a valid slot number.

### port

Specifies a valid port number.

### detail

Specifies the details of the LLDP neighbor information.

## Modes

Privileged EXEC mode

## Usage Guidelines

Use this command to display LLDP information for all neighboring devices on the specified interface.

## Examples

To display LLDP neighbor information on a specific interface, enter the following:

```
device# show lldp neighbors interface ethernet 1/18
Local Port  Dead Interval  Remaining Life  Remote Port ID  Remote Port  Descr  Chassis ID          Tx  Rx
System Name
Eth 1/18    120                115            Ethernet 2/25   Eth 2/25     768e.f807.6000    655 654
R6
```

To display detailed LLDP neighbor information on a specific interface, enter the following:

```
device# show lldp neighbors interface ethernet 1/18 detail
Neighbors for Interface Eth 1/18

MANDATORY TLVs
=====
Local Interface: Eth 1/18 (Local Interface MAC: 768e.f805.5816)
Remote Interface: Ethernet 2/25 (Remote Interface MAC: 768e.f807.610d)
Dead Interval: 120 secs
Remaining Life : 118 secs
Chassis ID: 768e.f807.6000
LLDP PDU Transmitted: 656 Received: 655

OPTIONAL TLVs
=====
Port Interface Description: Eth 2/25
System Name: R6
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show lldp statistics

Displays the LLDP statistics on all interfaces or a specified interface.

## Syntax

```
show lldp statistics [ interface [ethernetslot/port ]]
```

## Parameters

### ethernet

Use this parameter to specify an Ethernet interface, followed by the slot or port number.

### slot

Specifies a valid slot number.

### port

Specifies a valid port number.

## Modes

Privileged EXEC mode

## Usage Guidelines

If you do not specify an interface, this command displays the LLDP statistics for all interfaces.

## Examples

To display LLDP statistics on the specified interface:

```
device# show lldp statistics interface ethernet 1/18
LLDP Interface statistics for Eth 1/18
Frames transmitted: 659
Frames Aged out:    0
Frames Discarded:  0
Frames with Error: 0
Frames Recieved:   657
TLVs discarded:    0
TLVs unrecognized: 0
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show loop-detection

Displays loop detection (LD) information at the system and interface level.

## Syntax

```
show loop-detection [ disabled-ports | globals | interface { ethernet interface | port-channel interface } | vlan vlan-id]
```

## Parameters

### disabled-ports

Displays the ports that are disabled by LD.

### globals

Displays global LD configuration values.

### interface

Specifies an Ethernet or port-channel interface.

#### ethernet *interface*

Specifies an Ethernet interface.

#### port-channel *interface*

Specifies a port-channel interface.

### vlan *vlan-id*

Specifies a VLAN.

## Modes

Privileged EXEC mode

## Examples

To display LD information at the system level:

```
device# show loop-detection
Strict Mode:
-----

Number of loop-detection instances enabled: 1

Interface: eth 2/6
  Enabled on VLANs: 100
  Shutdown Disable: No
  Interface status: UP
  Auto enable in: Never

Packet Statistics:
vlan      sent      rcvd      disable-count
100       100         0         0

Loose Mode:
-----

Number of LD instances:  2
Disabled Ports:         2/7

Packet Statistics:
vlan      sent      rcvd      disable-count
100       100         0         0
```

To display ports disabled by LD:

```
device# show loop-detection disabled-ports
Ports disabled by loop detection
-----
port      age(min)      disable cause
2/6       5             Disabled by Self
```

To display global LD configuration values:

```
device# show loop-detection globals
Loop Detection:           Disabled
Shutdown-time (minutes):  0
Hello-time (msec):       1000
Raslog-duration (minutes): 10
```

To display LD configuration values for an Ethernet interface:

```
device# show loop-detection interface ethernet 2/6
Number of LD instances:  1
Enabled on VLANs:       100
Shutdown Disable:       No
Interface status:       UP
Auto enable in:         Never

Packet Statistics:
vlan      sent      rcvd      disable-count
100       100         0         0
```

To display LD configuration values for a VLAN interface:

```
device# show loop-detection vlan 5
Number of LD instances:  2
Disabled Ports:         eth2/7

Packet Statistics:
vlan      sent      rcvd
100       100         0
```



## History

Release version	Command history
17r.1.00	This command was introduced.

# show mac-address-table

Displays MAC address table information.

## Syntax

**show mac-address-table**

**show mac-address-table bridge-domain** [*id*]

**show mac-address-table cluster** *cluster-ID* [{ **bridge-domain** [*bd-ID*] } | **client** *client-ID* ] | **client-pw** | **local** | **remote** | [**vlan** *vlan-ID* ]]

**show mac-address-table count** [ **bridge-domain** *id* ]

**show mac-address-table** [ **address** *mac-address* ] [ **aging-time** ] | [**dynamic** [ **address** *mac-address* ] ] | [ **interface** **ethernet** *slot/port* | **port-channel** *interface number* ] | **vlan** *vlan id* ] | [**interface** { **ethernet** *slot/port* | **port-channel** *number* } | **tunnel** *tunnel id* ] | [ **mdb** [ *mac-address* ] | **client** <*client-name*> | **vlan** <*vlan-id*> ] ] | [**static** [ **address** *mac-address* ] ] | [**interface** { **ethernet** *slot/port* | **port-channel** *number* } ] | [**vlan** *vlan id* ] | [**vlan** *vlan id* ]

## Parameters

### **bridge-domain** *id*

Specifies the displaying of MAC addresses learned under a bridge domain. When a bridge domain identifier is not specified, information is displayed about MAC addresses learned under all bridge domains.

### **cluster** *cluster-ID*

Displays the MAC addresses learned under the specified MCT cluster ID.

### **bridge-domain** *id*

Displays the MAC addresses learned for the bridge domain of the MCT cluster. When a bridge domain identifier is not specified, information is displayed about MAC addresses learned under all bridge domains.

### **client** *client-ID*

Displays the MAC addresses learned for the client ID of the MCT cluster.

### **client-pw**

Specifies the PW client to display all the MAC addresses learned from other VPLS PE nodes over MCT bridge-domains.

### **local**

Displays the local MAC addresses for the cluster or the specified client ID.

### **remote**

Displays the remote MAC addresses for the cluster or the specified client ID.

### **vlan** *vlan-ID*

Displays the MAC addresses for the client VLAN ID of the MCT cluster.

### **address** *MAC-address*

Displays forwarding information for a 48-bit MAC address. The valid format is *H.H.H* (available in Privileged EXEC mode only).

### **aging-time**

Displays aging-time.

**dynamic address** *MAC-address*

Specifies the dynamic MAC addresses for an ethernet interface, port-channel, or VLAN. The valid format is *H.H.H* (available in Privileged EXEC mode only).

**interface ethernet** *slot/port*

Specifies the ethernet interface with a valid slot number/port number.

**port-channel** *number*

Specifies the port channel interface number. The range is from 1 - 512 based on the platform.

**vlan** *vlan id*

Specifies the VLAN interface. The VLAN ID range is from 1 - 4090.

**tunnel** *tunnel id*

Specifies the tunnel interface. The tunnel ID range is from 1 - 100000.

**mdb** *MAC-address*

Specifies the MDB information for the cluster client specific macs. The valid format is *H.H.H* (available in Privileged EXEC mode only).

**client** *client-name*

Displays the client instance. Specify the client name with a maximum of 64 characters.

**static address** *mac-address*

Specifies the static MAC address for an ethernet interface , port-channel, or VLAN. The valid format is *H.H.H* (available in Privileged EXEC mode only).

## Modes

Privileged EXEC mode.

## Examples

The following example shows how to display MAC table information for all bridge domains.

```
device# show mac-address-table bridge-domain

VlanId/BD-Id  Mac-address      Type    State    Ports/LIF/peer-ip
629 (B)       0011.2222.5555   Dynamic Active   eth 1/3.100
629 (B)       0011.2222.6666   Dynamic Inactive eth 1/1.500
629 (B)       0011.2222.1122   Dynamic Active   10.12.12.12
629 (B)       0011.2222.3333   static  Inactive   po 5.700
629 (B)       0011.0101.5555   Dynamic Active   eth 1/2.400

Total MAC addresses : 5
```

The following example shows the number of forwarding entries in the MAC address table for bridge domain 1.

```
device# show mac-address-table count bridge-domain 1

Total MAC addresses : 5
```

The following example displays the MAC address table aging time.

```
device# show mac-address-table aging-time
MAC Aging-time : 300 seconds
```

The following example displays the MAC address table for an MCT cluster.

```
device# show mac-address-table cluster 1
VlanId/BDId Mac-address      Type           State  Ports/LIF/PW
102 (V)      0001.0001.0001 Dynamic-CCL    Active eth 1/2
102 (V)      0001.0001.0111 Static-CCL     Active po 100
102 (V)      0001.0001.0111 CCR           Active Eth 3/66
104 (V)      0024.387c.8f00 Dynamic-CCL    Active Po 3
107 (V)      768e.f80b.2801 CR            Active 10.16.16.16
100 (B)      001b.ed0b.ae00 Dynamic-CL     Active 10.2.2.2
100 (B)      0230.0774.0aac Dynamic-CL     Active eth 1/2
100 (B)      0230.0774.0aac Dynamic-CR     Active po100
200 (B)      003d.ed0b.ae00 Dynamic-CL     Active 10.3.3.3
```

## History

Release version	Command history
16r.1.00	This command was introduced.
16r.1.01	Added the MCT cluster and client options.
17r.1.01	Added the bridge domain and PW client options for an MCT cluster.

# show media tunable-optic-sfpp

Displays the channels on which the tunable optic interfaces are currently operating.

## Syntax

```
show media tunable-optic-sfpp [ channel channel_number]
```

## Parameters

**channel** *channel\_number*

The channel number to display. The range of valid values is from 0 through 102.

## Modes

Privileged EXEC mode

## Command Output

The **show media tunable-optic-sfpp** command displays the following information:

Output field	Description
Channel	The number assigned to the channel.
Wavelength	The wavelength on which the optic interface is operating.

## Examples

Sample output for a single channel.

```
device# show media tunable-optic-sfpp channel 2
command is show-media-tunable-optic-sfpp-channel-2.
  Channel  Wavelength
  =====  =====
  2         1568.36
```

show media tunable-optic-sfpp

Sample output for all channels.

```
device# show media tunable-optic-sfpp
command is show-media-tunable-optic-sfpp.
Channel    Wavelength
=====
1          1568.77
2          1568.36
3          1567.95
4          1567.54
5          1567.13
6          1566.72
7          1566.31
8          1565.90
9          1565.50
10         1565.09
11         1564.68
12         1564.27
13         1563.86
14         1563.45
15         1563.05
16         1562.64
17         1562.23
18         1561.83
19         1561.42
20         1561.01
(Output truncated for brevity.)
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# show monitor

Displays the monitoring information for all Port Mirroring sessions or for a single session.

## Syntax

```
show monitor [ session session_number ]
```

## Parameters

**session** *session\_number*

Specifies a session identification number. Valid values range from 0 through 511.

## Modes

Privileged EXEC mode

## Command Output

The **show monitor** command displays the following information:

Output field	Description
Session	The identifying value applied to the session
Type	The type of session.
Description	The session description.
State	The current state of the session.
Source interface	The interface that the session is using to access the device.
Destination interface	The destination for the session.
Direction	Displays whether the interface is receiving, transmitting, or both.

## Examples

To display monitoring information for all Port Mirroring sessions:

```
device# show monitor

Session           :1
Type              :Remote source session
Description       :Test monitor session
State             :Enabled
Source interface  :eth 0/1 (Up)
Destination interface :Vlan x
Direction        :Rx
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# show mpls autobw-template

Displays the output of the MPLS auto-bandwidth template.

## Syntax

```
show mpls autobw-template [ detail ]
```

## Parameters

**detail**

Displays the auto-bandwidth template information in detail.

## Modes

Global configuration mode

## Examples

The following example displays a sample output of the command.

```
device# show mpls autobw-template
Total number of auto-bandwidth templates: 2
Name          Adjust Interval  Adjust Threshold  Over/und Limit  Minimum Bandwidth  Maximum Bandwidth  Monitor Only  Ref. Count
aaa           1200          10          5/ 15           1000      8000          No           3
bbb           600          Table       3/ 10           200       20000         No           5
```

The following example displays a sample output of the command using the *detail* option.

```
device# show mpls autobw-template detail
Total number of auto-bandwidth templates: 2
Auto-bandwidth template aaa:
adjustment-interval: 1200 sec, adjustment-threshold: 10, mode: monitor-and-signal
overflow-limit: 5, underflow-limit: 15
minimum-bw: 1000 kbps, maximum-bw: 8000 kbps
sample-record: enabled
number of paths associated: 3
Auto-bandwidth template bbb:
adjustment-interval: 600 sec, adjustment-threshold: Table, mode: monitor-and-signal
overflow-limit: 3, underflow-limit: 10
minimum-bw: 200 kbps, maximum-bw: 20000 kbps
sample-record: disabled
number of paths associated: 5
```

## History

Release version	Command history
17r.1.00	This command was introduced.



# show mpls autobw-threshold-table

Displays the global-threshold table with the range of the current-bandwidth and the corresponding absolute adjustment-threshold.

## Syntax

```
show mpls auto-threshold-table
```

## Modes

Operates in all modes.

## Examples

The following example displays the output of the command.

```
device# show mpls autobw-threshold-table
Auto-bandwidth threshold table
Range (kbps)      Threshold (kbps)
0-10              2000
11-1000           3000
1001-10000        5000
10001-max         10000
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show mpls bypass-lsp

Use the **show mpls bypass-lsp** command for displaying all dynamic bypass LSPs along with static bypass LSPs.

## Syntax

```
show mpls bypass-lsp [ detail | extensive | wide | up | down ] [ { name bypass_lsp_name [ extensive
```

## Parameters

### detail

Displays the MPLS bypass LSP information in detail.

### extensive

Displays the MPLS bypass LSP information with extensive detailed information.

### wide

Displays MPLS bypass LSP brief wide information.

### up

Displays the operationally UP bypass LSPs.

### down

Displays the operationally DOWN bypass LSPs.

**name** *bypass\_lsp\_name*

Displays a MPLS bypass LSP by the specified name.

### extensive

Displays MPLS bypass LSP extensive information.

## Modes

Privileged EXEC mode.

## Examples

The following example displays the output of the show mpls bypass-lsp command.

```
device# show mpls bypass-lsp
Note: Bypass LSPs marked with + are dynamic bypass LSPs
Bypass LSP      To          Admin Oper  Tunnel  Up/Dn  Retry  Active
Name            Address     State State Intf    Times Num  Path
my-bypass-lsp  20.20.20.20 UP    UP    tnl3    1      0    path-for-bypass-lsp
```

The following example displays the output of the **show mpls bypass-lsp** command with the **static wide** options

```
device# show mpls bypass-lsp static wide
Bypass LSP      To          Admin Oper  Tunnel  Up/Dn  Retry  Active
Name            Address     State State Intf    Times Num  Path
my-bypass-lsp  20.20.20.20 UP    UP    tnl3    1      0    path-for-bypass-
lsp
```

The following example displays the output of the **show mpls bypass-lsp** command using the **extensive** option.

```

device# show mpls bypass-lsp extensive
LSP my-bypass-lsp, to 20.20.20.20
From: 29.29.29.29, admin: UP, status: UP, tunnel interface(primary path): tn13
Times primary LSP goes up since enabled: 1
Adaptive
Primary path: path-for-bypass-lsp, up: yes, active: yes
Maximum retries: None, no. of retries: 0
ReoptimizeTimer configured 360
  ReoptimizeTimer next expiration in 93 seconds
Setup priority: 7, hold priority: 0, cos: 3
Max rate: 1000 kbps, mean rate: 1000 kbps, max burst: 5000 bytes
Tie breaking: random, hop limit: 6
Exclude any of admin groups: 15 16 17
Exclude interface(s): Eth 1/3
CSPF-computation-mode configured: te-metric
Constraint-based routing enabled: yes
  Path calculated using constraint-based routing: yes
  Path calculated using interface constraint: no
  Path calculated using te-metric
  Path cost: 2
Explicit path hop count: 1
18.18.18.18(S)
Recorded routes:
  Protection codes/Rtr Id flags: P: Local  N: Node  B: Bandwidth  I: InUse R: RtrId
18.29.1.18 -> 18.20.1.20
Bypass Tunnel bandwidth
Maximum bandwidth: 1000 kbps
Reservable bandwidth [priority] kbps:
  [0] 1000 [1] 1000 [2] 1000 [3] 1000
  [4] 1000 [5] 1000 [6] 1000 [7] 1000
Current signaled rate: 1000 kbps
Active Path:
  Tunnel interface: tn13, outbound interface: Eth 1/1
  Tunnel index: 3, Tunnel instance: 1, Out label: 2061
History:
  0 10-13 22:41:58 : LSP tunnel is Enabled
  1 10-13 22:41:58 : CSPF-Computation successful for Primary path path-for-bypass-lsp. Computed
route:
      ->18.29.1.18->18.20.1.20
  2 10-13 22:41:58 : Primary path path-for-bypass-lsp. RRO received:
      ->18.29.1.18->18.20.1.20
  3 10-13 22:41:58 : Primary path path-for-bypass-lsp setup successful . Instance id 1
  4 10-13 22:41:58 : LSP tunnel is UP with Primary path path-for-bypass-lsp as Active
  5 10-13 22:41:58 : Tunnel added or updated, out-interface: Eth 1/1, out-label 2061
Riding Backup Lsps: 1
Ingress backups: 1, up: 1, active: 0
Transit backups: 0, up: 0, active: 0
Ingress backups
State From To LSPname
UP 18.29.1.29 20.20.20.20 my-fac-bkup-frr-lsp

```

## History

Release version	Command history
17r1.00	This command was introduced.

# show mpls lsp

Displays detailed information about a specific LSP. The underflow-limit parameter and the number of consecutive underflows are displayed. The adjustment-threshold is used from the global table is indicated with the value for current rate. The **show mpls lsp extensive** command shows the adjustment event with the previous rate and the maximum sampled rate.

## Syntax

```
show mpls lsp { lsp_name } [ detail | extensive ] | autobw-samples
```

```
show mpls lsp autobw-samples
```

## Parameters

### detail

Displays information in detail.

### extensive

Displays information with History.

### autobw-sample

Displays the sample history instead of LSP History as in the extensive option.

## Modes

This command operates under all modes.

## Usage Guidelines

## Command Output

The **show mpls lsp** command displays the following information:

Output field	Description
Name	The name of the LSP. LSPs are displayed in alphabetical order.
To	The egress LER for the LSP.
From	The LSPs source address, configured with the <b>from</b> command. When a source IP address has not been specified for the LSP with the from command, and the LSP has not been enabled, then '(n/a)' displays in the 'From' field.
admin	The administrative state of the LSP. Once the user activates the LSP with the <b>enable</b> command, the administrative state changes from DOWN to UP.
status	The operational state of the LSP. This field indicates whether the LSP has been established through signaling and is capable of having packets forwarded through it. When the status of the LSP is DOWN, the reason why the LSP is down is shown in parentheses. There maybe a short period of time after the user enables the LSP that the administrative state of the LSP is UP, but the status is DOWN. Once the LSP has been established through signaling, both the administrative state and the status is UP.
Tunnel interface (primary path)	The path currently selected for this LSP.
Times primary LSP goes up since enabled	The number of times the status of the LSPs primary path transitions from DOWN to UP.

Output field	Description
Metric	The metric for the LSP, configured with the <b>metric</b> command.
Pri. path	The name of the primary path for this LSP and whether the path is currently active.
up	Displays if the primary path is UP.
active	Specifies if the primary path is active.
Setup priority	The configured setup priority for the LSP.
hold priority	The configured hold priority for the LSP.
Max rate	The maximum rate of packets that can go through the LSP (in kbps), set with the <b>traffic-eng max-rate</b> command.
mean rate	The average rate of packets that can go through the LSP (in kbps), set with the <b>traffic-eng mean-rate</b> command.
mode	Mode displays if the LSP is in monitor-only or monitor-and-signal mode.
adjustment threshold	Displays the configured adjustment-threshold value.
minimum bw	The configured minimum bandwidth.
maximum bw	The configured maximum bandwidth.
overflow limit	Displays the configured overflow-limit value.
underflow limit	The number of samples that have to be below the threshold, to trigger a premature adjustment.
sample-record	Whether the template is set to record the sample history.
Constraint-based routing enabled	Whether CSPF is in effect for the LSP.
Path calculated using constraint-based routing	Whether the explicit path used by the active path was calculated using the constraint-based routing.
Path calculated using interface constraint	Whether the explicit path used by the active path was calculated using the interface-based routing.
Path cost	The total cost of this path.
Tie breaking	The tie-breaking method CSPF uses to select a path from a group of equal-cost paths to the egress LER, set with the <b>tie-breaking</b> command.
LDP tunnel enabled	If LDP tunneling is enabled, the line reads "yes". If it is not enabled, the line reads "no".
Soft preemption enabled	Soft preemption minimizes traffic disruptions and gracefully reroutes the preempted LSPs.
Sec. path	The name of the secondary path for this LSP and whether the path is currently active.
active	Displays if the secondary path is active.
Hot-standby	Whether the secondary path is a hot-standby path.
status	The operational state of the secondary path
Setup priority	The configured setup priority for the LSP.
hold priority	The configured hold priority for the LSP
Max rate	The maximum rate of packets that can go through the LSP (in kbps), set with the <b>traffic-eng max-rate</b> command.
mean rate	The average rate of packets that can go through the LSP (in kbps), set with the <b>traffic-eng mean-rate</b> command.
max burs	The maximum size (in bytes) of the largest burst the LSP can send at the maximum rate, set with the <b>traffic-eng max-burst</b> command.
mode	Mode shows if the LSP is in monitor-only or monitor-and-signal mode.
adjustment threshold	Displays the configured adjustment-threshold value.
minimum bw	The configured minimum bandwidth.
maximum bw	The configured maximum bandwidth.
overflow limit	Displays the configured overflow-limit value.
underflow limit	The number of samples which must be below the threshold to trigger a premature adjustment.

Output field	Description
sample-record	Whether the template is set to record the sample history.
Constraint-based routing enabled	Whether CSPF is in effect for the LSP.
hop limit	The maximum number of hops a path calculated by CSPF can have, set with the <b>hop-limit</b> command.
Soft preemption enabled	Soft preemption minimizes traffic disruptions and gracefully reroutes the preempted LSPs
Active path attributes	
Tunnel interface	The MPLS tunnel interface port ID.
outbound interface	The outbound label used by the active path of the LSP.
Tunnel index	The tunnel index for the active path of the LSP.
Tunnel instance	
outbound label	The outbound label used by the active path of the LSP.
Auto-bandwidth running info mode	
adjustment interval	Displays the configured adjustment-timer value.
adjustment threshold	Displays the configured adjustment-threshold value.
overflow limit	Displays the configured overflow-limit value.
underflow limit	The number of samples that must be below the threshold to trigger a premature adjustment.
minimum bw	The configured minimum bandwidth.
maximum bw	The configured maximum bandwidth.
Samples collected	Number of samples collected so far in the current adjustment-interval.
max sampled bw	The maximum number of the samples collected so far in the current adjustment-interval.
last sample	The last sampled-bandwidth.
Sample-record	Whether the template is set to record the sample history.
adjustment due in	Displays the time remaining for the current adjust-interval to expire.
Adjustment ignored	This consecutive number of times the adjustment was ignored due to any reason.
Current bandwidth	Current running bandwidth.
Recorded routes	The addresses recorded by the RECORD_ROUTE object during RSVP signaling.

## Examples

The following example shows the output of the command, specifying the LSP *name* with the **extensive** option.

```

device# show mpls bypass-lsp extensive
LSP my-bypass-lsp, to 20.20.20.20
  From: 29.29.29.29, admin: UP, status: UP, tunnel interface(primary path): tn13
  Times primary LSP goes up since enabled: 1
  Adaptive
  Primary path: path-for-bypass-lsp, up: yes, active: yes
  Maximum retries: None, no. of retries: 0
  ReoptimizeTimer configured 360
  ReoptimizeTimer next expiration in 93 seconds
  Setup priority: 7, hold priority: 0, cos: 3
  Max rate: 1000 kbps, mean rate: 1000 kbps, max burst: 5000 bytes
  Tie breaking: random, hop limit: 6
  Exclude any of admin groups: 15 16 17
  Exclude interface(s): Eth 1/3
  CSPF-computation-mode configured: te-metric
  Constraint-based routing enabled: yes
  Path calculated using constraint-based routing: yes
  Path calculated using interface constraint: no
  Path calculated using te-metric
  Path cost: 2
  Explicit path hop count: 1
  18.18.18.18(S)
  Recorded routes:
  Protection codes/Rtr Id flags: P: Local  N: Node  B: Bandwidth  I: InUse R: RtrId
  18.29.1.18 -> 18.20.1.20
  Bypass Tunnel bandwidth
  Maximum bandwidth: 1000 kbps
  Reservable bandwidth [priority] kbps:
  [0] 1000 [1] 1000 [2] 1000 [3] 1000
  [4] 1000 [5] 1000 [6] 1000 [7] 1000
  Current signaled rate: 1000 kbps
  Active Path:
  Tunnel interface: tn13, outbound interface: Eth 1/1
  Tunnel index: 3, Tunnel instance: 1, Out label: 2061
  History:
  0 10-13 22:41:58 : LSP tunnel is Enabled
  1 10-13 22:41:58 : CSPF-Computation successful for Primary path path-for-bypass-lsp. Computed
route:
  ->18.29.1.18->18.20.1.20
  2 10-13 22:41:58 : Primary path path-for-bypass-lsp. RRO received:
  ->18.29.1.18->18.20.1.20
  3 10-13 22:41:58 : Primary path path-for-bypass-lsp setup successful . Instance id 1
  4 10-13 22:41:58 : LSP tunnel is UP with Primary path path-for-bypass-lsp as Active
  5 10-13 22:41:58 : Tunnel added or updated, out-interface: Eth 1/1, out-label 2061
  Riding Backup Lsps: 1
  Ingress backups: 1, up: 1, active: 0
  Transit backups: 0, up: 0, active: 0
  Ingress backups
  State From To LSPname
  UP 18.29.1.29 20.20.20.20 my-fac-bkup-frr-lsp

```

The following example displays the output of the command when using the **detail** option.

```

Router# show mpls lsp extensive
LSP lsp1, to 23.23.23.23
  From: 34.34.34.34, admin: UP, status: UP, tunnel interface(primary path): tn11
  Times primary LSP goes up since enabled: 1
  Metric: 0, Adaptive
  Maximum retries: NONE, no. of retries: 0
  Pri. path: NONE, up: yes, active: yes
  Setup priority: 7, hold priority: 0
  Max rate: 0 kbps, mean rate: 0 kbps, max burst: 0 bytes
  Auto-bandwidth. template: templatel, mode: monitor-only
    adjustment interval: 86400 sec, adjustment threshold: 0
    minimum bw: 0 kbps, maximum bw: 2147483647 kbps
    overflow limit: 0, underflow limit: 20, sample-record: disabled
  Constraint-based routing enabled: yes
    Path calculated using constraint-based routing: yes
    Path calculated using interface constraint: no
    Path cost: 20
  Tie breaking: random, hop limit: 0
  LDP tunneling enabled: no
  Soft preemption enabled: no
  Sec. path: vial6, active: no
    Hot-standby: no, status: down, adaptive
    Setup priority: 7, hold priority: 0
    Max rate: 0 kbps, mean rate: 0 kbps, max burst: 0 bytes
    Auto-bandwidth. template: NONE, mode: monitor-and-signal
      adjustment interval: 300 sec, adjustment threshold: Table
      minimum bw: 0 kbps, maximum bw: 2147483647 kbps
      overflow limit: 5, underflow-limit: 10, sample-record: enabled
    Constraint-based routing enabled: yes
    hop limit: 0
    Soft preemption enabled: no
  Active Path attributes:
    Tunnel interface: tn11, outbound interface: e4/3
    Tunnel index: 2, Tunnel instance: 1 outbound label: 2049
    Auto-bandwidth running info. Mode: monitor-only
      adjustment interval: 1200 sec(T), adjustment threshold: Table(T)
      overflow limit: 0, underflow limit: 3
      minimum bw: 0 kbps(T), maximum bw: 9647 kbps(T)
      Samples collected: 14, max sampled bw: 0 kbps, last sample: 0 kbps
      Overflow-count: 0, Underflow-count: 2,max-underflow-sample: 34kbps
      Sample-record: enabled(T)
      adjustment due in 1174 seconds
      Adjustment ignored: 0 time(s)
      No adjustment since activation. Current bandwidth: 0 kbps
  Recorded routes:
  Protection codes/Rtr Id flag: P: Local  N: Node  B: Bandwidth  I: InUse R: RtrId
  31.31.31.16 -> 161.161.161.1

```



The following output displays the command with the **autobw-samples** option.

```

device# show mpls lsp name lsp1 autobw-samples
LSP lsp1, to 23.23.23.23
From: 34.34.34.34, admin: UP, status: UP, tunnel interface(primary path): tn11
Times primary LSP goes up since enabled: 1
Metric: 0, Adaptive
Maximum retries: NONE, no. of retries: 0
Pri. path: NONE, up: yes, active: yes
Setup priority: 7, hold priority: 0
Max rate: 0 kbps, mean rate: 0 kbps, max burst: 0 bytes
Auto-bandwidth. template: templatel, mode: monitor-only
  adjustment interval: 86400 sec, adjustment threshold: 0
  minimum bw: 0 kbps, maximum bw: 2147483647 kbps
  overflow limit: 0, underflow limit: 20, sample-record: disabled
Constraint-based routing enabled: yes
  Path calculated using constraint-based routing: yes
  Path calculated using interface constraint: no
  Path cost: 20
Tie breaking: random, hop limit: 0
LDP tunneling enabled: no
Soft preemption enabled: no
Sec. path: vial6, active: no
  Hot-standby: no, status: down, adaptive
  Setup priority: 7, hold priority: 0
  Max rate: 0 kbps, mean rate: 0 kbps, max burst: 0 bytes
  Auto-bandwidth. template: NONE, mode: monitor-and-signal
    adjustment interval: 300 sec, adjustment threshold: Table
    minimum bw: 0 kbps, maximum bw: 2147483647 kbps
    overflow limit: 5, underflow-limit: 10, sample-record: enabled
  Constraint-based routing enabled: yes
  hop limit: 0
  Soft preemption enabled: no
Active Path attributes:
  Tunnel interface: tn11, outbound interface: e4/3
  Tunnel index: 2, Tunnel instance: 1 outbound label: 2049
  Auto-bandwidth running info. Mode: monitor-only
    adjustment interval: 1200 sec(T), adjustment threshold: 3000(A)
    overflow limit: 0, underflow limit: 4
    minimum bw: 0 kbps(T), maximum bw: 9647 kbps(T)
    Samples collected: 5, max sampled bw:6598 kbps,last sample: 0 kbps
    Overflow-count: 0, Underflow-count: 2,max-underflow-sample: 34kbps
    Sample-record: enabled(T)
    adjustment due in 1174 seconds
    Adjustment ignored: 0 time(s)
    No adjustment since activation. Current bandwidth: 0 kbps
Recorded routes:
  Protection codes/Rtr Id flag: P: Local N: Node B: Bandwidth I: InUse R: RtrId
  31.31.31.16 -> 161.161.161.1
Auto Bandwidth Sample History:
1 Feb 4 19:56:06 : Path p1 active with rate 3000 kbps
2 Feb 4 19:57:06 : 4445 kbps
3 Feb 4 19:58:06 : 4855 kbps
4 Feb 4 19:59:06 : 4501 kbps
5 Feb 4 20:00:06 : 4200 kbps
6 Feb 4 20:01:06 : 4455 kbps
7 Feb 4 20:02:06 : 4319 kbps
8 Feb 4 20:03:06 : 4299 kbps
9 Feb 4 20:04:06 : 4582 kbps
10 Sample recording disabled
11 Feb 4 20:16:31 : 3630 kbps
12 Feb 4 20:17:31 : 2924 kbps
13 Feb 4 20:17:38 : Rate adjusted from 2500 to 4500 kbps
    Reason: Adjustment-interval expiry
14 Feb 4 20:18:06 : 4500 kbps
15 Feb 4 20:19:06 : 4500 kbps
16 Feb 4 20:20:06 : 4500 kbps
17 Feb 4 20:21:06 : 4500 kbps
18 Feb 4 20:16:31 : 4500 kbps
19 Feb 4 20:17:31 : 4500 kbps
20 Feb 4 20:17:38 : Adjustment ignored. Threshold not crossed

```

show mpls lsp

```
21 Feb 4 20:16:31 : 9000 kbps
22 Feb 4 20:17:31 : 9000 kbps
23 Feb 4 20:17:38 : Rate adjusted from 4500 to 9000 kbps
    Reason: Overflow limit exceeded
24 Feb 4 20:18:06 : 4500 kbps
25 Feb 4 20:19:06 : 4500 kbps
```

## History

Release version	Command history
16r.1.00	This command was introduced.
17r.1.00	This command was modified to include dynamic bypass LSP information and autobw-samples options.

# show mpls policy

Use the show mpls policy command to view the current policy.

## Syntax

```
show mpls policy
```

## Modes

Privileged EXEC mode.

## Examples

The following example shows a sample output of the command.

```
Router#show mpls policy
Current MPLS policy settings:
  CSPF interface constraint: disabled
  CSPF-Group computation-mode: disabled
  CSPF computation-mode use bypass metric: disabled
  CSPF computation-mode use bypass liberal: disabled
  TTL propagation for MPLS label: disabled, IPVPN: disabled, IP over MPLS: enabled
  Inter-AS route filtering: enabled, Intra-AS iBGP route filtering: disabled
  Ingress tunnel accounting: disabled
  Polling interval for MPLS LSP traffic statistics: 300 seconds
  Advertise TE parameters via: OSPF
  Handle IGP neighbor down event - ISIS: No OSPF: No
  LSP rapid retry: enabled, maximum number of retries: no limit
  LSP periodic retry time: 30 seconds
  FRR backup/detour retry time: 30 seconds
  Auto-bandwidth: enabled, sample-interval: 60 seconds
  Maximum samples recorded per LSP: 1500
  Soft preemption cleanup-timer: 30 seconds
  MPLS TE Periodic Flooding Timer : 180 seconds
  MPLS TE flooding thresholds
    Global UP thresholds : None
    Global DOWN thresholds : None
    Default UP thresholds : 15 30 45 60 75 80 85 90 95 96 97 98 99 100
    Default DOWN thresholds : 99 98 97 96 95 90 85 80 75 60 45 30 15
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show mpls rsvp

Displays RSVP information.

## Syntax

```
show mpls rsvp [ igp-sync [ link [ detail | ip ip_addr ] ] | lsp [ detail | name name ] ] | interface [ detail | ethernet slot/port | ve
  vlan_id ] | neighbor detail | session | statistics ]
```

## Parameters

### igp-sync

Displays the RSVP IGP synchronization information.

#### link

Displays the RSVP IGP synchronization link brief information.

#### detail

Displays the RSVP IGP synchronization link detailed information.

#### ip *ip\_addr*

Displays the RSVP IGP synchronization specified link information.

#### lsp

Displays the RSVP IGP synchronization LSP brief information.

#### detail

Displays the RSVP IGP synchronization LSP detailed information.

#### name *name*

Displays the RSVP IGP synchronization specified LSP information.

#### interface

Displays RSVP interface information.

#### detail

Displays RSVP interface information in detail.

#### ethernet *slot/port*

Displays the specified RSVP Ethernet information.

#### ve *vlan\_id*

Displays the specified VE information.

#### neighbor

Displays the RSVP neighbor information.

#### detail

Displays the RSVP neighbor information in detail.

#### session

Displays the RSVP session information. For additional information, see the **show mpls rsvp session** command page.

#### statistics

Displays the RSVP control packet statistics information.

## Modes

Global configuration mode.

The following example shows the command using the interface option in the interface mode.

```
device(config-if-e1000-1/8)# show mpls interface e1/7
Admin: Up      Oper: Up
MTU: 1500 bytes
Maximum BW: 10000000 kbps, maximum reservable BW: 10000000 kbps
Admin group: 0x00000000
Reservable BW [priority] kbps:
  [0] 10000000   [1] 10000000   [2] 10000000   [3] 10000000
  [4] 10000000   [5] 10000000   [6] 10000000   [7] 10000000
Last sent reservable BW [priority] kbps:
  [0] 10000000   [1] 10000000   [2] 10000000   [3] 10000000
  [4] 10000000   [5] 10000000   [6] 10000000   [7] 10000000
Soft Preemption under provisioned BW [priority] kbps: [0] 0   [1] 0   [2] 0   [3] 0
  [4] 0   [5] 0   [6] 0   [7] 0
LDP tunnel count: 0
```

The following example shows the command using the **interface detail** option in the router mpls mode.

```
device(config-router-mpls)# show mpls rsvp interface detail

Interface State MD5  RelMsg Bundle SRefresh Num of OutSegs Num of
e1/1      Up      OFF OFF      OFF      OFF      1/0/1      2/2
e1/2      Up      OFF OFF      OFF      OFF      0/0/0      0/0
e1/10     Dn      OFF OFF      OFF      OFF      0/0/0      0/0
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show mpls rsvp interface

Displays the RSVP refresh reduction settings for an interface.

## Syntax

```
show mpls rsvp interface [ detail | [ethernet slot/port] | [ ve vlan_id ] ]
```

## Parameters

### detail

Displays the RSVP interface information in detail.

### ethernet slot/port

Specifies the selected Ethernet interface.

### ve vlan\_id

Specifies the selected VE interface.

## Modes

Privileged EXEC mode.

## Usage Guidelines

To clear the RSVP statistics counters, use the **clear mpls rsvp statistics** command.

This command operates in all modes.

## Command Output

The **show mpls rsvp interface detail** command displays the following information:

Output field	Description
Status	Whether the interface is UP or DOWN.
MD5	Whether RSVP message authentication is enabled on the interface.
RelMsg	Whether RSVP reliable messaging is enabled on the interface.
Bundle	Whether RSVP bundle messages are enabled on the interface.
SRefresh	Whether RSVP summary refresh is enabled on the interface.
<b>MPLS TE flooding thresholds in use</b>	
Hello-interval	The interval between successive hello packets in milliseconds.
Hello-tolerance	The number of hello intervals before the node treats the neighbor as if communication has been lost.
<b>PacketType</b>	
Path	The number of Path messages received with a packet processing error.
Resv	The number of RESV messages received with a packet processing error.
PathErr	The number of PathErr messages received with a packet processing error.

Output field	Description
ResvErr	The number of ResvErr messages received with a packet processing error.
PathTear	The number of PathTear messages received with a packet processing error.
ResvTear	The number of reservation confirmation messages received with a packet processing error.
ResvConf	The number of reservation confirmation messages received with a packet processing error.
Bundle	The number of bundled RSVP messages sent and received on the interface with a packet processing error.
Ack	The number of Ack messages sent and received on the interface with a packet processing error.
SumRefresh	The number of summary refresh messages sent and received on the interface with a packet processing error.
Hello	The number of RSVP Hello's with a packet processing error
<b>Errors</b>	
Rev MD5 Auth Errors	The number of MD5 authentication errors on received packets on the interface.
Pkt with MsgId drop	Number of packets with dropped message IDs.
Pkt with SRef drop	Number of packets with dropped.
NACK Object	Number of objects without acknowledgment.
Active Facility Backups	Number of Active facility backup tunnels.
Inactive Facility Backups	Number of inactive facility backup tunnels.
Duplicate preempts dropped	Number of dropped preempts.

## Examples

The following example shows a abbreviated output of the command with the **detail** option.

```

device# show mpls rsvp interface
G = Interface is using global config for Refresh Reduction, Reliable Messaging
L = Interface is using local config for Refresh Reduction, Reliable Messaging
D = Refresh Reduction, Reliable Messaging is exclusively disabled on Interface

Interface      State   MD5   RelMes  Bundle  SRefresh  Num of OutSeg  Num of
Ve20           Down   OFF   ON<G>   OFF     ON<G>     Act/Inact/Resev  Preempts/softPrpt
                                0/0/0                                0/0

MPLS TE flooding thresholds in use
  Default      UP   thresholds: 15 30 45 60 75 80 85 90 95 96 97 98 99 100
  Default      DOWN thresholds: 99 98 97 96 95 90 85 80 75 60 45 30 15

Hello-interval: 0 sec, Hello-tolerance: 0 <Hello Inactive, Global configuration>

PacketType      Sent      Total      Received      Since Last Clear
Path            29373     32824     29373         32824
Resv            33047     30209     33047         30209
PathErr         12         0         12            0
ResvErr         89         10         89            10
PathTear        111         45         111           45
ResvTear         0          0          0             0
ResvConf         0          0          0             0
Bundle           0          0          0             0
Ack              0          0          0             0
SumRefresh       0          0          0             0
Hello            0          0          0             0

Errors           Total      Since Last Clear
Rev MD5 Auth Errors 0          0
Pkt with MsgId drop 0          0
Pkt with SRef drop  0          0
NACK Object         0          0

Active Facility Backups: 0
Inactive Facility Backups: 0
Duplicate preempts dropped: 0
....

```

## History

Release version	Command history
16r.1.00	This command was introduced.



# show mpls rsvp session

Use the show mpls rsvp session command to view the policy and detailed history of the specified LSP.

## Syntax

```
show mpls rsvp session [ backup [extensive|protection-available|protection-unavailable|wide]] brief | destination ip_addr |
detail | [ down | up [ egress | ingress | transit [ interface-in | out-interface [ ethernet slot/port | ve vlan_id ] ] ] ] [ egress |
ingress [ down | up [ interface-in | out-interface [ ethernet slot/port | ve vlan_id ] ] ] ] [ in-interface | out-interface
[ ethernet slot/port | ve vlan_id ] ] | extensive [ in-interface | out-interface [ ethernet slot/port | ve vlan_id ] ] | name name |
transit [ down | up [ in-interface | out-interface [ ethernet slot/port | ve vlan_id ] ] ] | wide ]
```

## Parameters

**session**

**backup**

Displays backup session information.

**detail**

Displays detailed backup session information.

**extensive**

Displays extensive backup session information, including History.

**protection-available**

Displays backup session information, with protection available.

**protection-unavailable**

Displays backup session information, with protection unavailable.

**wide**

Displays backup session information, including any long session names.

**brief**

Displays brief session information.

**destination** *ip\_addr*

Displays the selected destination IP address.

**detail**

Displays detailed session information.

**egress**

Displays egress session information.

**ingress**

Displays ingress session information.

**extensive**

Displays the specified LSP RSVP session information, including History.

**name** *name*

Displays session by the specified name.

**transit**

Displays a transit session information.

**in-interface**

Displays RSVP sessions coming into an interface.

**out-interface**

Displays RSVP sessions going out on an interface.

**ethernetslot/pot**

Displays the selected Ethernet information.

**vevlan\_id**

Displays the selected virtual Ethernet information.

**down**

Displays inactive session information.

**up**

Displays up session information.

**wide**

Displays long LSP names.

## Modes

Global configuration mode.

## Usage Guidelines

Many options in the **show mpls rsvp session** command can be combined for a more specific result. For example, the **show mpls rsvp session backup name lsp1** command is helpful for limiting the output to useful information by session name.

## Examples

The following example displays a sample output of the **show mpls rsvp session** command.

```

device# show mpls rsvp session
Codes: DI:Ingress Detour  DT:Transit Detour  DM:Merged Detour
      DE:Egress Detour   BI:Ingress Backup  BM: Merged Backup  BE:Egress Backup
      RP:Repaired Session  BYI: Bypass Ingress

Total Number of such sessions are: 13

Ingress RSVP: 13 session(s)
To           From           St Style Lbl_In  Lbl_Out Out_If  LSPname
13.14.13.13  30.11.1.30 (DI)  Up SE   -       3762    Eth 1/6 to13_f30_1
13.14.13.13  30.11.1.30      Up SE   -       2048    Eth 1/5 to13_f30_1
13.14.13.13  30.11.1.30 (DI)  Up SE   -       2903    Eth 1/6 to13_f30_2
13.14.13.13  30.11.1.30      Up SE   -       2639    Eth 1/5 to13_f30_2
13.14.13.13  30.11.1.30 (DI)  Up SE   -       2066    Eth 1/5 to13_f30_3
13.14.13.13  30.11.1.30      Up SE   -       2051    Eth 1/6 to13_f30_3
13.14.13.14  30.11.1.30 (DI)  Up SE   -       2154    Eth 1/5 to13_f30_4
13.14.13.14  30.11.1.30      Up SE   -       2052    Eth 1/6 to13_f30_4
13.14.13.14  30.11.1.30 (DI)  Up SE   -       2083    Eth 1/5 to13_f30_5
13.14.13.14  30.11.1.30      Up SE   -       2053    Eth 1/6 to13_f30_5
13.14.13.14  30.11.1.30 (DI)  Up SE   -       2153    Eth 1/6 to13_f30_6
13.14.13.14  30.11.1.30      Up SE   -       2054    Eth 1/5 to13_f30_6
13.14.13.14  30.11.1.30 (DI)  Up SE   -       3496    Eth 1/5 to13_f30_7
13.14.13.14  30.11.1.30      Up SE   -       3000    Eth 1/6 to13_f30_7
13.14.13.14  30.11.1.30 (DI)  Up SE   -       2156    Eth 1/5 to13_f30_8
13.14.13.14  30.11.1.30      Up SE   -       2056    Eth 1/6 to13_f30_8
13.14.13.14  30.11.1.30 (DI)  Up SE   -       2157    Eth 1/6 to13_f30_9
13.14.13.14  30.11.1.30      Up SE   -       2057    Eth 1/5 to13_f30_9
13.14.13.14  30.11.1.30 (DI)  Up SE   -       2158    Eth 1/6 to13_f30_9
13.14.13.14  30.11.1.30      Up SE   -       2059    Eth 1/5 to13_f30_9
13.14.13.14  30.11.1.30 (DI)  Up SE   -       3319    Eth 1/5 to13_f30_9
13.14.13.14  30.11.1.30      Up SE   -       2849    Eth 1/6 to13_f30_9
13.14.13.14  30.11.1.30 (DI)  Up SE   -       2160    Eth 1/6 to13_f30_9
13.14.13.14  30.11.1.30      Up SE   -       2061    Eth 1/5 to13_f30_9
13.14.13.14  30.11.1.30 (DI)  Up SE   -       2161    Eth 1/5 to13_f30_9
13.14.13.14  30.11.1.30      Up SE   -       2063    Eth 1/6 to13_f30_9

```

The following example displays a sample output of the **show mpls rsvp session backup** command.

```

device# show mpls rsvp session backup
Codes: DI:Ingress Detour DT:Transit Detour DM:Merged Detour
      DE:Egress Detour BI:Ingress Backup BM: Merged Backup BE:Egress Backup
      RP:Repaired Session BYI: Bypass Ingress

Total Number of such sessions are: 4000

Ingress RSVP: 2000 session(s)
To           From           St Style Lbl_In  Lbl_Out Out_If  LSPname
172.16.50.1  172.16.20.1      Up SE   -      2360    Ve 41  R20_to_R50
              _p3_p3_1
172.16.50.1  172.16.20.1(BI) Up -    -      3581    Ve 52  R20_to_R50
              _p3_p3_1
172.16.50.1  172.16.20.1      Up SE   -      2131    Ve 41  R20_to_R50
              _p3_p3_10
172.16.50.1  172.16.20.1(BI) Up -    -      3076    Ve 52  R20_to_R50
              _p3_p3_10
172.16.50.1  172.16.20.1      Up SE   -      2130    Ve 41  R20_to_R50
              _p3_p3_100
172.16.50.1  172.16.20.1(BI) Up -    -      3075    Ve 52  R20_to_R50
              _p3_p3_100
172.16.50.1  172.16.20.1      Up SE   -      2129    Ve 41  R20_to_R50
              _p3_p3_100
              0
172.16.50.1  172.16.20.1(BI) Up -    -      3074    Ve 52  R20_to_R50
              _p3_p3_100
              0
172.16.50.1  172.16.20.1      Up SE   -      2128    Ve 41  R20_to_R50
              _p3_p3_101
172.16.50.1  172.16.20.1(BI) Up -    -      3073    Ve 52  R20_to_R50
              _p3_p3_101
172.16.50.1  172.16.20.1      Up SE   -      2127    Ve 41  R20_to_R50
              _p3_p3_102
172.16.50.1  172.16.20.1(BI) Up -    -      3072    Ve 52  R20_to_R50
              _p3_p3_102
172.16.50.1  172.16.20.1      Up SE   -      2126    Ve 41  R20_to_R50
              _p3_p3_103
172.16.50.1  172.16.20.1(BI) Up -    -      4095    Ve 52  R20_to_R50
              _p3_p3_103
172.16.50.1  172.16.20.1      Up SE   -      2125    Ve 41  R20_to_R50
              _p3_p3_104
172.16.50.1  172.16.20.1(BI) Up -    -      4089    Ve 52  R20_to_R50
              _p3_p3_104
172.16.50.1  172.16.20.1      Up SE   -      2124    Ve 41  R20_to_R50
              _p3_p3_105
172.16.50.1  172.16.20.1(BI) Up -    -      4085    Ve 52  R20_to_R50
              _p3_p3_105
172.16.50.1  172.16.20.1      Up SE   -      2123    Ve 41  R20_to_R50
              _p3_p3_106
172.16.50.1  172.16.20.1(BI) Up -    -      4084    Ve 52  R20_to_R50
              _p3_p3_106
172.16.50.1  172.16.20.1      Up SE   -      2122    Ve 41  R20_to_R50
              _p3_p3_107
172.16.50.1  172.16.20.1(BI) Up -    -      4083    Ve 52  R20_to_R50
              _p3_p3_107
172.16.50.1  172.16.20.1      Up SE   -      2121    Ve 41  R20_to_R50
              _p3_p3_108
172.16.50.1  172.16.20.1(BI) Up -    -      4079    Ve 52  R20_to_R50
              _p3_p3_108
172.16.50.1  172.16.20.1      Up SE   -      2120    Ve 41  R20_to_R50
              _p3_p3_109
172.16.50.1  172.16.20.1(BI) Up -    -      4077    Ve 52  R20_to_R50
              _p3_p3_109
172.16.50.1  172.16.20.1      Up SE   -      2119    Ve 41  R20_to_R50
              _p3_p3_11
172.16.50.1  172.16.20.1(BI) Up -    -      4069    Ve 52  R20_to_R50
              _p3_p3_11
172.16.50.1  172.16.20.1      Up SE   -      2118    Ve 41  R20_to_R50
              _p3_p3_110

```

```

172.16.50.1      172.16.20.1(BI)    Up - -      4068   Ve 52   R20_to_R50
                _p3_p3_110
172.16.50.1      172.16.20.1      Up SE -      2117   Ve 41   R20_to_R50
                _p3_p3_111
172.16.50.1      172.16.20.1(BI)    Up - -      4066   Ve 52   R20_to_R50
Aborted: by user
device#

```

The following example displays a sample output of the **show mpls rsvp session** command using the **wide** option.

```

device# show mpls rsvp session wide
Codes: DI:Ingress Detour  DT:Transit Detour  DM:Merged Detour
       DE:Egress Detour   BI:Ingress Backup BM: Merged Backup BE:Egress Backup
       RP:Repaired Session BYI: Bypass Ingress

Total Number of such sessions are: 6

Ingress RSVP:      3 session(s)
To                From                St Style Lbl_In  Lbl_Out Out_If  LSPname
19.19.19.19      29.29.29.29(BYI)    Up SE -      3      Eth 1/4  my-bypass-transit
20.20.20.20      29.29.29.29(BYI)    Up SE -      2049   Eth 1/1  my-bypass-ingress
20.20.20.20      29.29.29.29(BI)    Up - -      3      Eth 1/1  my-fbkup-lsp-ingress
20.20.20.20      29.29.29.29        Up SE -      2056   Eth 1/3  my-fbkup-lsp-ingress

Transit RSVP:      1 session(s)
To                From                St Style Lbl_In  Lbl_Out Out_If  LSPname
19.19.19.19      18.18.18.18        Up SE 2048   3      Eth 1/3  my-fbkup-lsp-transit
19.19.19.19      18.18.18.18(BI)    Up - 2048   3      Eth 1/4  my-fbkup-lsp-transit

Egress RSVP:       2 session(s)
To                From                St Style Lbl_In  Lbl_Out Out_If  LSPname
29.29.29.29      20.20.20.20        Up SE 3      -      -      my-fbkup-lsp-egress
29.29.29.29      20.20.20.20        Up SE 3      -      -      my-bypass-egress      Up SE
-                2051      Eth 1/6  to13_f30_3
                100

```

The following example displays a sample output of the **show mpls rsvp session** command with the **detail** option.

```

device# show mpls rsvp session detail
Codes: DI:Ingress Detour DT:Transit Detour DM:Merged Detour
      DE:Egress Detour BI:Ingress Backup BM: Merged Backup BE:Egress Backup
      RP:Repaired Session BYI: Bypass Ingress

Total Number of such sessions are: 7

Ingress RSVP:      3 session(s)
To                From                St Style Lbl_In  Lbl_Out Out_If  LSPname
19.19.19.19      29.29.29.29(BYI)  Up SE   -      3      Eth 1/4  my-bypass-
                                          transit

Tunnel ID: 7, LSP ID: 1
Time left in seconds (PATH refresh: 11, ttd: 4294156
                    RESV refresh: 21, ttd: 152)
Tspec: peak 0 kbps rate 0 kbps size 0 bytes m 20 M 65535
Setup priority: 7, hold priority: 0
Session attribute flags:0x04
(SE Style)
Explicit path hop count: 1
29.19.2.19 (S)
Received RRO count: 1
Protection codes/Rtr Id flag: P: Local N: Node B: Bandwidth I: InUse R: RtrId
29.19.2.19
PATH sentto: 29.19.2.19 (Eth 1/4 ) (MD5 OFF), Message ID: --
RESV rcvfrom: 29.19.2.19 (Eth 1/4 ) (MD5 OFF), Message ID: --

To                From                St Style Lbl_In  Lbl_Out Out_If  LSPname
20.20.20.20      29.29.29.29(BYI)  Up SE   -      2049   Eth 1/1  my-bypass-
                                          ingress

Tunnel ID: 6, LSP ID: 1
Time left in seconds (PATH refresh: 9, ttd: 4294154
                    RESV refresh: 10, ttd: 154)
Tspec: peak 0 kbps rate 0 kbps size 0 bytes m 20 M 65535
Setup priority: 7, hold priority: 0
Session attribute flags:0x04
(SE Style)
Explicit path hop count: 2
18.29.1.18 (S) -> 18.20.1.20 (S)
Received RRO count: 2
Protection codes/Rtr Id flag: P: Local N: Node B: Bandwidth I: InUse R: RtrId
18.29.1.18 -> 18.20.1.20
PATH sentto: 18.29.1.18 (Eth 1/1 ) (MD5 OFF), Message ID: --
RESV rcvfrom: 18.29.1.18 (Eth 1/1 ) (MD5 OFF), Message ID: --

To                From                St Style Lbl_In  Lbl_Out Out_If  LSPname
20.20.20.20      29.29.29.29(BI)  Up -    -      3      Eth 1/1  my-fbkup-1
                                          sp-ingress

Tunnel ID: 8, LSP ID: 1
Time left in seconds (PATH refresh: 0, ttd: 4294015)
Tspec: peak 0 kbps rate 0 kbps size 0 bytes m 20 M 65535
Setup priority: 7, hold priority: 0
Session attribute flags:0x06
(Label recording,SE Style)
Explicit path hop count: 1
20.20.20.20 (S)
PATH rcvfrom: None (downstream only)
PATH sentto: 20.20.20.20 (Eth 1/1 ) (MD5 OFF), Message ID: --
Riding bypass lsp: my-bypass-ingress

To                From                St Style Lbl_In  Lbl_Out Out_If  LSPname
20.20.20.20      29.29.29.29      Up SE   -      2056   Eth 1/3  my-fbkup-1
                                          sp-ingress

Tunnel ID: 8, LSP ID: 1
Time left in seconds (PATH refresh: 14, ttd: 4294172
                    RESV refresh: 24, ttd: 122)
Tspec: peak 0 kbps rate 0 kbps size 0 bytes m 20 M 65535
Setup priority: 7, hold priority: 0
Session attribute flags:0x17
(Label recording,SE Style,Protection: Local,Node)

```

```

Setup priority: 7, hold priority: 0
Bandwidth: 0 kbps, hop limit: 255
Backup LSP: UP. Nexthop (node) protection available
Bandwidth protection not available.
Up/Down times: 1, num retries: 0
Explicit path hop count: 2
29.19.1.19 (S) -> 20.19.1.20 (S)
Received RRO count: 2
Protection codes/Rtr Id flag: P: Local N: Node B: Bandwidth I: InUse R: RtrId
29.19.1.19 (P) -> 20.19.1.20
PATH sentto: 29.19.1.19 (Eth 1/3 ) (MD5 OFF), Message ID: --
RESV rcvfrom: 29.19.1.19 (Eth 1/3 ) (MD5 OFF), Message ID: --

Transit RSVP: 1 session(s)
To From St Style Lbl_In Lbl_Out Out_If LSPname
19.19.19.19 18.18.18.18 Up SE 2048 3 Eth 1/3 my-fbkup-1
sp-transit

Tunnel ID: 4, LSP ID: 1
Time left in seconds (PATH refresh: 29, ttd: 126
RESV refresh: 10, ttd: 146)
Tspec: peak 0 kbps rate 0 kbps size 0 bytes m 20 M 65535
Setup priority: 7, hold priority: 0
Session attribute flags:0x17
(Label recording,SE Style,Protection: Local,Node)
Setup priority: 7, hold priority: 0
Bandwidth: 0 kbps, hop limit: 255
Backup LSP: UP. Nexthop (link) protection available
Bandwidth protection not available.
Up/Down times: 1, num retries: 0
Explicit path hop count: 1
29.19.1.19 (S)
Received RRO count: 1
Protection codes/Rtr Id flag: P: Local N: Node B: Bandwidth I: InUse R: RtrId
29.19.1.19
PATH rcvfrom: 18.29.1.18 (Eth 1/1 ) (MD5 OFF) , Message ID: --
PATH sentto: 29.19.1.19 (Eth 1/3 ) (MD5 OFF), Message ID: --
RESV rcvfrom: 29.19.1.19 (Eth 1/3 ) (MD5 OFF), Message ID: --

To From St Style Lbl_In Lbl_Out Out_If LSPname
19.19.19.19 18.18.18.18(BI) Up - 2048 3 Eth 1/4 my-fbkup-1
sp-transit

Tunnel ID: 4, LSP ID: 1
Time left in seconds (PATH refresh: 0, ttd: 4294317)
Tspec: peak 0 kbps rate 0 kbps size 0 bytes m 20 M 65535
Setup priority: 7, hold priority: 0
Session attribute flags:0x06
(Label recording,SE Style)
Explicit path hop count: 1
19.19.19.19 (S)
PATH rcvfrom: None (downstream only)
PATH sentto: 19.19.19.19 (Eth 1/4 ) (MD5 OFF), Message ID: --
Riding bypass lsp: my-bypass-transit

Egress RSVP: 3 session(s)
To From St Style Lbl_In Lbl_Out Out_If LSPname
29.29.29.29 20.20.20.20 Up SE 3 - - my-fbkup-1
sp-egress

Tunnel ID: 1, LSP ID: 1
Time left in seconds (PATH refresh: 20, ttd: 133
RESV refresh: 38, ttd: 4293457)
Tspec: peak 0 kbps rate 0 kbps size 0 bytes m 20 M 65535
Setup priority: 7, hold priority: 0
Session attribute flags:0x17
(Label recording,SE Style,Protection: Local,Node)
Setup priority: 7, hold priority: 0
Bandwidth: 0 kbps, hop limit: 255
PATH rcvfrom: 29.19.1.19 (Eth 1/3 ) (MD5 OFF) , Message ID: --

To From St Style Lbl_In Lbl_Out Out_If LSPname
29.29.29.29 20.20.20.20 Up SE 3 - - my-bypass-
```

```

                                                    egress
Tunnel ID: 3, LSP ID: 1
Time left in seconds (PATH refresh: 0, ttd: 142
                      RESV refresh: 1, ttd: 4293660)
Tspec: peak 0 kbps rate 0 kbps size 0 bytes m 20 M 65535
Setup priority: 7, hold priority: 0
Session attribute flags:0x04
(SE Style)
PATH rcvfrom: 18.29.1.18      (Eth 1/1      ) (MD5 OFF) , Message ID: --

To          From          St Style Lbl_In  Lbl_Out Out_If  LSPname
29.29.29.29 19.19.19.19 Up SE    3      -      -      dbyp-29.19
                                           .1.19-14

Tunnel ID: 19, LSP ID: 1
Time left in seconds (PATH refresh: 28, ttd: 156
                      RESV refresh: 15, ttd: 4293589)
Tspec: peak 0 kbps rate 0 kbps size 0 bytes m 20 M 65535
Setup priority: 7, hold priority: 0
Session attribute flags:0x04
(SE Style)
PATH rcvfrom: 29.14.1.14      (Eth 1/7      ) (MD5 OFF) , Message ID: --

```

## History

Release version	Command history
16r.1.00	This command was introduced.
17r.1.00	This command was modified to include MPLS bypass information.
17r.1.00	This command was modified to include the backup parameter.



# show mpls statistics

Displays MPLS statistics.

## Syntax

```
show mpls statistics { oam }
```

```
show mpls statistics { transit [ label label | ldp [ ip_addr | submask | label ] | rsvp label ] }
```

```
show mpls statistics { tunnel [ destination ip_addr | index vif_index | ldp [ destination ip_addr | index vif_index ] | rsvp [ destination ip_addr | index vif_index | name name ] ] }
```

## Parameters

### oam

Displays the MPLS OAM statistics.

### transit

Displays the MPLS transit statistics.

#### label *label*

Displays the MPLS transit statistics for the selected label.

#### ldp *ip\_addr*

Displays the MPLS transit LDP statistics for the selected IP address.

#### rsvp

Displays the MPLS transit RSVP statistics .

### tunnel

Displays the MPLS tunnel statistics.

#### destination *destination*

Displays the MPLS tunnel statistics for the selected tunnel destination.

#### index *vif\_index*

Displays the MPLS tunnel statistics for the selected tunnel index.

#### ldp

Displays the MPLS tunnel LDP statistics.

##### destination *destination*

Displays the MPLS tunnel statistics for the selected tunnel destination.

##### index *vif\_index*

Displays the MPLS tunnel statistics for the selected tunnel index.

#### rsvp

Displays the MPLS tunnel RSVP statistics.

##### destination *destination*

Displays the MPLS tunnel statistics for the selected tunnel destination.

##### index *vif\_index*

Displays the MPLS tunnel statistics for the selected tunnel index.

**name** *name*

Displays the MPLS tunnel statistics for the selected named tunnel.

## Modes

Router MPLS LSP configuration mode.

## Command Output

The **show mpls statistics** command displays the following information:

Output field	Description
Name	Tunnel name.
Intf	Interface tunnel name.
Prot	Protection code: L-Local, R- RtrId
Total Packets	Displays the total number of packets.
Total Bytes	Displays the total number of bytes.
Since Last Clear Packets	Displays the number of packets since last clear.
Since Last Clear Bytes	Displays the number of bytes since the last clear.
Rate Pkts/sec	Displays the packets per second rate.
Rate Bytes/sec	Displays the bytes per second rate.

## Examples

The following example shows the command using the **tunnel** option.

```
device# configure
device(config)# router mpls
device(config-router-mpls)# lsp t2
device(config-router-mpls-lsp-t2)# show mpls statistics tunnel
```

Name	Intf	Prot	Total		Since Last clear		Pkts/sec	Rate Bytes/sec
			Packets	Bytes	Packets	Bytes		
t1	tn10	R	2004	28175882	2004	28175882	6	93919
t2	tn11	L	3101	40373763	3101	40373763	10	134579

The following example shows the command using the **tunnel rsvp** option.

```
device# configure
device(config)# router mpls
device(config-router-mpls)# lsp t2
device(config-router-mpls-lsp-t2)# show mpls statistics tunnel rsvp
```

Name	Intf	Total		Since Last clear		Pkts/sec	Rate Bytes/sec
		Packets	Bytes	Packets	Bytes		
t1	tn10	2004	28175882	2004	28175882	6	93919

The following example shows the command using the **transit** option.

```
device# configure
device(config)# router mpls
device(config-router-mpls)# lsp t2
device(config-router-mpls-lsp-t2)# show mpls statistics transit
```

IN Label	Prot	Total		Since Last clear		Pkts/sec	Rate Bytes/sec
		Packets	Bytes	Packets	Bytes		
2048	R	2004	28175882	2004	28175882	6	93919
2050	L	3101	40373763	3101	40373763	10	134579

The following example shows the command using the **transit ldp** option.

```

device# configure
device(config)# router mpls
device(config-router-mpls)# lsp t2
device(config-router-mpls-lsp-t2)# show mpls statistics transit ldp

```

IN Label	Total		Since Last clear		Rate	
	Packets	Bytes	Packets	Bytes	Pkts/sec	Bytes/sec
2050	3101	40373763	3101	40373763	10	134579

## History

Release version	Command history
16r.1.01	This command was introduced.

# show mpls te database

Fate-sharing group membership for any given TE link or node consists of its own membership to the group, and the TE node to which it belongs. The output from the **show mpls te database detail** command displays the fate-sharing groups to which the TE links or nodes belong.

## Syntax

```
show mpls te [ area ipv4_addr | detail | link ipv4_addr | node ipv4_addr ]
```

## Parameters

**area** *ipv4\_addr*

Displays the specified OSPF area or ISIS level information.

**detail**

Displays detailed information.

**link***ipv4\_addr*

Displays the specified link information.

**node***ipv4\_addr*

Displays the specified node information by the node router ID.

## Modes

EXEC mode.

## Examples

In the following example output, node *10.20.20.20* displays fate-sharing group information for *group1/100* and *group2/10*.

```
device# show mpls te database detail
This Router is 10.100.100.100
Global Link Gen 21
Area 0
  NodeID: 10.20.20.20, Type: Router
info from applied local policies:
  cspf-group member information (name/penalty):
    group1/100
    Type: P2P, To: 10.1.1.1, Local: 10.1.1.2, Remote: 10.1.1.1, Gen 16
    Admin Group: 0x00000000
    Metric: 1
    Link BW: 10000000 kbits/sec
    Reservable BW: 10000000 kbits/sec
    Unreserved BW:
      [0] 10000000 kbits/sec [1] 10000000 kbits/sec
      [2] 10000000 kbits/sec [3] 10000000 kbits/sec
      [4] 10000000 kbits/sec [5] 10000000 kbits/sec
      [6] 10000000 kbits/sec [7] 10000000 kbits/sec
info from applied local policies:
  cspf-group member information (name/penalty):
    group2/10
    Type: P2P, To: 10.1.2.1, Local: 10.1.2.2, Remote: 10.1.2.1, Gen 13
    Admin Group: 0x00000000
    Metric: 1
    Link BW: 10000000 kbits/sec
    Reservable BW: 10000000 kbits/sec
    Unreserved BW:
      [0] 10000000 kbits/sec [1] 10000000 kbits/sec
      [2] 10000000 kbits/sec [3] 10000000 kbits/sec
      [4] 10000000 kbits/sec [5] 10000000 kbits/sec
      [6] 10000000 kbits/sec [7] 10000000 kbits/sec
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show netconf

Displays NETCONF session.

## Syntax

```
show netconf
```

## Modes

Privileged EXEC mode

## Usage Guidelines

The text output is extensive. Extreme Networks recommends redirecting the output to a text file.

## Examples

Typical NETCONF session output.

```
device# show netconf
netconf-state capabilities capability urn:ietf:params:netconf:base:1.0
netconf-state capabilities capability urn:ietf:params:netconf:base:1.1
netconf-state capabilities capability urn:ietf:params:netconf:capability:writable-running:1.0
netconf-state capabilities capability urn:ietf:params:netconf:capability:startup:1.0
netconf-state capabilities capability urn:ietf:params:netconf:capability:xpath:1.0
netconf-state capabilities capability urn:ietf:params:netconf:capability:validate:1.0
netconf-state capabilities capability urn:ietf:params:netconf:capability:validate:1.1
netconf-state capabilities capability http://tail-f.com/ns/netconf/actions/1.0
<output truncated>
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# show netconf capabilities

Displays the capabilities associated with each NETCONF session.

## Syntax

```
show netconf capabilities
```

## Modes

Privileged EXEC mode

## Usage Guidelines

## Examples

Typical command example of output.

```
device# show netconf capabilities
netconf-state capabilities capability urn:ietf:params:netconf:base:1.0
netconf-state capabilities capability urn:ietf:params:netconf:base:1.1
netconf-state capabilities capability urn:ietf:params:netconf:capability:writable-running:1.0
netconf-state capabilities capability urn:ietf:params:netconf:capability:startup:1.0
netconf-state capabilities capability urn:ietf:params:netconf:capability:xpath:1.0
netconf-state capabilities capability urn:ietf:params:netconf:capability:validate:1.0
netconf-state capabilities capability urn:ietf:params:netconf:capability:validate:1.1
netconf-state capabilities capability http://tail-f.com/ns/netconf/actions/1.0
<output truncated>
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# show notification stream

Displays notifications about the event stream.

## Syntax

`show notification stream ?`

## Modes

Privileged EXEC mode

## Examples

Typical output example for this command.

```
device# show notification stream ?  
Possible completions:  
no event streams present
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# show ntp status

Displays the Network Time Protocol (NTP) status.

## Syntax

```
show ntp status
```

## Modes

User EXEC mode

Privileged EXEC mode

## Usage Guidelines

Use this command to display the active NTP server. If an NTP server is not configured, the command output displays the server as "LOCL". Otherwise, the command displays the NTP server IP address.

## Examples

To show the local device NTP status when an NTP server is not configured:

```
device# show ntp status
active ntp server is LOCL
```

To show the configured NTP server:

```
device# show ntp status
active ntp server is 10.21.2.80
```

## History

Release version	Command history
16r.1.00	This command was introduced.

show openflow

# show openflow

Displays the OpenFlow configuration at the global level.

## Syntax

`show openflow`

## Modes

Privileged EXEC mode

## Usage Guidelines

It includes the asynchronous messages sent to the controller.

## Examples

```

device# show openflow
Administrative Status:      Enabled
SSL Status:                 Enabled
Datapath-ID:               8ff88e740000
Number of Controllers:     3

Controller:                 A1
Controller Type:           OFV130
Connection Mode:           active TCP
Listening Address:         10.24.5.5
Connection Port:           1987
VRF Name:                  mgmt-vrf
Source IP used:            NA
Connection Status:         CLOSE
Role:                      Equal
  Asynchronous Configuration: Packet-in (no-match|action)
                             Port-status (add|delete|modify)
                             Flow-removed (idle-timeout|hard-timeout|delete|grp-delete)

Controller:                 A2
Controller Type:           OFV130
Connection Mode:           active SSL
Listening Address:         10.24.5.5
Connection Port:           1987
VRF Name:                  mgmt-vrf
Source IP used:            NA
Connection Status:         TCP_CONNECTING
Role:                      Equal
  Asynchronous Configuration: Packet-in (no-match|action)
                             Port-status (add|delete|modify)
                             Flow-removed (idle-timeout|hard-timeout|delete|grp-delete)

Controller:                 A3
Controller Type:           OFV130
Connection Mode:           active TCP
Listening Address:         10.24.5.5
Connection Port:           1987
VRF Name:                  mgmt-vrf
Source IP used:            NA
Connection Status:         CLOSE
Role:                      Equal
  Asynchronous Configuration: Packet-in (no-match|action)
                             Port-status (add|delete|modify)
                             Flow-removed (idle-timeout|hard-timeout|delete|grp-delete)

Connection Status:         OPENFLOW_ESABLISHED
Role:                      Equal
  Asynchronous Configuration: Packet-in (no-match|action)
                             Port-status (add|delete|modify)
                             Flow-removed (hard-timeout|delete|grp-delete)

Match Capability:
L2 : Port, Source MAC, Destination MAC, Ether type, Vlan, Vlan PCP
L3 : Port, Vlan, vlan PCP, Ethertype, Source IP, Destination IP, IP Protocol, IP TOS,TCP/UDP Src Port,
TCP/UDP Dst Port
L23: All

Openflow Enabled Ports: Eth 3/25, Eth 3/26

Default action: DROP
Maximum number of flows allowed: 32768
Active flow: 0

device#

```

## Command Output

The **show openflow** command displays the following information:

Field	Description
Administrative Status	Indicates the administrative status of OpenFlow on the device.
SSL status	Indicates the SSL status of OpenFlow controller on the device.
Data path ID	Displays the data path ID assigned to the device.
Number of Controllers	Lists the number of controller connections configured on the device.
Controller Type	Indicates the OpenFlow protocol version that is supported on the device.
Connection mode	Indicates the mode of the controller connection configured. You can configure active or passive connection to controllers. An active connection is initiated by the device. In a passive connection, the device is in the listening mode, and accepts requests from controllers. If the optional controller address is not specified, any controller can establish a connection with the device in the passive mode. If there is an address, only that IP address can connect to the device in passive mode.
Connection port	Indicates the TCP port that is used for connection to the controller. By default, port 6633 is used.
Connection status	Indicates the status of the specified controller.
Role	Indicates the role of the specified controller.
Asynchronous configuration	Asynchronous messages sent to the specified controller.
Match capability	Specifies the matching rules supported for Layer 2 and Layer 3.
OpenFlow enabled ports	Lists the ports on the device that are enabled for OpenFlow.
Default action	Indicates the default action for packets that do not match any configured flows. By default, such packets are dropped. However, you can configure these packets to be sent to the controller by using the <b>default-behavior send-to-controller</b> command.
Maximum number of flows allowed	Indicates the maximum number of flows allowed on the device that is configured by using the <b>system-max openflow-flow-entries</b> command.

## History

Release version	Command history
16r.1.00	This command was introduced.

# show openflow controller

Displays the status of the OpenFlow controller.

## Syntax

```
show openflow controller
```

## Modes

Privileged EXEC mode

## Examples

The following example displays the status of the OpenFlow controller.

```
device# show openflow controller
Controller Mode  TCP/SSL IP-address  Port  Status  Role
A1      active  TCP      10.24.5.5  1987  CLOSE   Equal
A2      active  SSL      10.24.5.5  6633  TCP_CONNECTING  Equal
A3      active  TCP      10.24.5.5  6653  CLOSE   Equal
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show openflow flow

Displays the OpenFlow flow that are configured on the devices with IPv4 fields at the global level.

## Syntax

```
show openflow flow
```

## Modes

Privileged EXEC mode

## Examples

The **show openflow flow** command has the match capability as below.

Layer 2: Port, Source MAC, Destination MAC, Ether type, VLAN, VLAN PCP

Layer 3 : Port, VLAN, VLAN PCP, Ethertype, Source IP, Destination IP, IP Protocol, IP ToS , IP Source Port, IP Destination Port

```
device # show openflow flow
Total Number of data packets sent to controller: 0
Total Number of data bytes sent to controller : 0

Total Number of Flows:                1
  Total Number of Port based Flows:    1
  Total Number of Generic based Flows:  0

Total Number of Openflow interfaces:   4
  Total Number of L2 interfaces:        0
  Total Number of L3 interfaces:        1
  Total Number of L23 interfaces:       2

Flow ID: 1 Priority: 32768 Status: Programmed
Rule:
  In Port:                               Eth 3/25
  In Vlan:                                Tagged[100]
  Vlan Priority:                           5
  Source Mac:                             0000.0011.1111
  Destination Mac:                        0000.0011.1111
  Ether type:                              0x800
  Source IPv4:                             1.1.1.0
  Source IPv4 Mask:                        255.255.255.0
  IP DSCP:                                 6

Instructions: Apply-Actions
  Action: FORWARD
          Out Port: Eth 3/26, Push-vlan-tag: 0x8100, vlanid: 232
          Vlan Priority: 5

Statistics:
  Total Pkts: 0
  Total Bytes: 0
```

## Command Output

The **show openflow flow** command displays the following information:

Field	Description
Total Number of Flows	The total number of flows on the device.
Total number of data packets sent to controller	The number of packets sent to the controller.
Total number of data bytes sent to controller	The number of bytes sent to the controller.
Priority	The priority of the flow set by the controller when the flow is added, in the range 0 to 65536. If the priority value was not specified, the device will assign the default value, 32768.
Status	Indicates whether the flow is configured correctly in the device. A correctly configured flow will have its status as active.
Rule	Specifies the matching rule for the flow.
Instruction	Applies the specified actions immediately.
Statistics	Indicates the counter of packets and bytes.

## History

Release version	Command history
16r.1.00	This command was introduced.

# show openflow group

Displays all the groups in a flow for an OpenFlow port.

## Syntax

```
show openflow group
```

## Modes

Privileged EXEC mode

## Usage Guidelines

The hardware resources are shared between OpenFlow and other features, so these resources are allocated on a first-come-first-serve basis.

## Examples

The command displays the minimum and maximum traffic rates for each ports.

```
device# show openflow group
Max number of total groups          : 512
Max number of buckets per group     : 8

TOTAL number of groups(Type:ALL) in the system      : 1
TOTAL number of groups(Type:SELECT) in the system  : 0
TOTAL number of groups(Type:Indirect)in the system : 0
TOTAL number of groups(Type:Fast Failover)in the system : 0

TOTAL number of groups in the system                : 1

Group id 1
Transaction id          4043243760 (f0ff00f0)
Type                   ALL
Packet Count           0
Byte Count             0
Flow Count             0
Number of buckets      2
bucket # 1
  Weight                1
  out port: Eth 3/25,
bucket # 2
  Weight                1
  out port: Eth 3/26,
```

## Command Output

The **show openflow group** command displays the following information:

Field	Description
Total number of groups	Total number of group of all types available on the flow, e.g. All, Indirect and Select.
Group ID	Displays the group ID number.



Field	Description
Transaction ID	Unique transaction ID for the specified group ID.
Type	Group type.
Packet count	The number of packets sent in the group.
Byte count	The number of bytes in the group.
Flow count	The number of flow in the group.
Number of buckets	Number of buckets per group.

## History

Release version	Command history
16r.1.00	This command was introduced.

# show openflow interface

Displays the detailed interface configuration and capabilities of all interfaces.

## Syntax

```
show openflow interface
```

## Modes

Privileged EXEC mode

## Examples

To show OpenFlow interface, enter the following command:

```
device # show openflow interface
Total number of Openflow interfaces: 4
Port   Link   Port-State   Speed   MAC           OF-Port-ID   Mode
Eth 3/25 Up     Forward      40G    748e.f88f.e9c7 868          123
Eth 3/26 Down   Forward      40G    748e.f88f.e9c8 872          123
Eth 3/27 Down   Forward      40G    748e.f88f.e9c9 876          13
Eth 3/28 Down   Forward      40G    748e.f88f.e9ca 880          hybrid 123
```

## Command Output

The **show openflow interface** command displays the following information:

Field	Description
Port	Indicates the port number on the device.
Link	Indicates the link status.
Port-State	Indicates the action to be performed on packets that reach the interface.
Speed	Indicates the port speed.
MAC	Indicates the MAC address of the port.
OF-Port-ID	Indicates the OpenFlow port ID that is assigned to the port on the device. Port numbers on the device are mapped to OpenFlow port IDs.
Mode	Indicates the OpenFlow mode enabled on the port.

## History

Release version	Command history
16r.1.00	This command was introduced.

# show openflow meter

Displays all the meters in a flow for an OpenFlow port.

## Syntax

```
show openflow meter
```

## Modes

Privileged EXEC mode

## Usage Guidelines

The hardware resources are shared between OpenFlow and other features, so these resources are allocated on a first-come,-first-served basis.

## Examples

```
Device# show openflow meter
TOTAL Meters: 1
Meter id: 1
  Transaction id:      4043243760
  Meter Flags:        KBPS BURST
  Flow Count:         0
  Number of bands:    1
  In packet count:    NA
  In byte count:      0
  Band Type:          DROP
    Rate:              30 kbps
    Burst size:         10000 kbps
    In packet band count: NA
    In byte band count: 0
device#
```

## Command Output

The **show openflow meter** command displays the following information:

Field	Description
Total number of meters	Total number of meters available in the flow.
Meter ID	Displays the meter ID number.
Transaction ID	Unique transaction ID for the specified meter ID.
Meter flags	Metering capability.
Flow count	The number of flow in the meter.
Number of bands	Number of bands per meter.
Band type	Band type supported on the meter. Supported band type is DROP.

## History

Release version	Command history
16r.1.00	This command was introduced.

# show openflow queues

Displays the queue entries for an interface for an OpenFlow port.

## Syntax

```
show openflow queues
```

## Modes

Privileged EXEC mode

## Usage Guidelines

Ensure that OpenFlow queuing is configured on the device. You can associate a flow with an `OFFPAT_ENQUEUE` action which forwards the packet through the specific queue on a port.

## Examples

The command displays the minimum and maximum traffic rates for each ports.

```
device# show openflow queues
Openflow Port      Eth 3/26
Queue 0
  Tx Packets: 0
  Tx Bytes: : 0
Queue 1
  Tx Packets: 0
  Tx Bytes: : 0
Queue 2
  Tx Packets: 0
  Tx Bytes: : 0
Queue 3
  Tx Packets: 0
  Tx Bytes: : 0
Queue 4
  Tx Packets: 0
  Tx Bytes: : 0
Queue 5
  Tx Packets: 0
  Tx Bytes: : 0
Queue 6
  Tx Packets: 0
  Tx Bytes: : 0
Queue 7
  Tx Packets: 0
  Tx Bytes: : 0
```

## Command Output

The **show openflow queues** command displays the following information:

Field	Description
OpenFlow port	Slot and port number.
Queue	Displays the queue number for the specified OpenFlow port.

show openflow queues

Field	Description
Packet	The number of transmitted packets in the queue.
Byte	The number of transmitted bytes in the queue.

## History

Release version	Command history
16r.1.00	This command was introduced.

# show openflow resources

Displays the OpenFlow usage of the resources at the global level.

## Syntax

**show openflow resources**

## Modes

Privileged EXEC mode

## Examples

```
device# show openflow resources
Used - Number of HW entries consumed
Free - Number of Port based flows that can be successfully Slot: 1 Module: slot 1
Openflow Flows: MAX: 8192      Used: 0      Free: 819
Chip Flows: MAX: 4096      Used: 0      Free: 4096
Chip Flows: MAX: 4096      Used: 0      Free: 4096
Chip Flows: MAX: 4096      Used: 0      Free: 4096
Chip Flows: MAX: 4096      Used: 0      Free: 4096
Chip Flows: MAX: 4096      Used: 0      Free: 4096
Chip Flows: MAX: 4096      Used: 0      Free: 4096
Slot: 2      Module: slot 2
Openflow Flows: MAX: 8192      Used: 0      Free: 819
Chip Flows: MAX: 4096      Used: 0      Free: 4096
Chip Flows: MAX: 4096      Used: 0      Free: 4096
Chip Flows: MAX: 4096      Used: 0      Free: 4096
Chip Flows: MAX: 4096      Used: 0      Free: 4096
Chip Flows: MAX: 4096      Used: 0      Free: 4096
Chip Flows: MAX: 4096      Used: 0      Free: 4096
Slot: 3      Module: slot 3
Openflow Flows: MAX: 8192      Used: 1      Free: 819
Chip Flows: MAX: 4096      Used: 0      Free: 4096
Chip Flows: MAX: 4096      Used: 0      Free: 4096
Chip Flows: MAX: 4096      Used: 0      Free: 4096
Chip Flows: MAX: 4096      Used: 0      Free: 4096
Chip Flows: MAX: 4096      Used: 1      Free: 4095
Chip Flows: MAX: 4096      Used: 0      Free: 4096
Slot: 4      Module: slot 4
Openflow Flows: MAX: 8192      Used: 0      Free: 819
Chip Flows: MAX: 4096      Used: 0      Free: 4096
Chip Flows: MAX: 4096      Used: 0      Free: 4096
Chip Flows: MAX: 4096      Used: 0      Free: 4096
Chip Flows: MAX: 4096      Used: 0      Free: 4096
Chip Flows: MAX: 4096      Used: 0      Free: 4096
Chip Flows: MAX: 4096      Used: 0      Free: 4096
Chip Flows: MAX: 4096      Used: 0      Free: 4096
Openflow Meter Resources: MAX: 1023
Used: 1
ALL MAX: 512      Used: 1      Free: 511
Tcam Profile:      Openflow Optimized 2
```

## Command Output

The **show openflow resources** command displays the following information:

Field	Description
Used	Number of hardware entries.
Free	Number of port based flows, that can be programmed.

show openflow resources

Field	Description
Slot	Indicates the slot number
Module	Indicates the device number
OpenFlow flows	Available, used and maximum number of OpenFlow flows for Layer 2 and Layer 3.
OpenFlow Meter resources	Available, used and maximum number of OpenFlow meters for the device.

## History

Release version	Command history
16r.1.00	This command was introduced.



# show overlay-gateway

Displays status and statistics for the VXLAN overlay-gateway instance.

## Syntax

```
show overlay-gateway [ name name [ vlan statistics | statistics ]
```

## Parameters

*name*

Name of the configured VXLAN gateway. Network OS supports only one gateway instance.

**vlan statistics**

Displays statistics for each VLAN for the VXLAN gateway. Statistics include transmitted and received packet counts and byte counts exchanged for each exported VLAN. Because each exported VLAN maps to a VXLAN, these statistics apply on a per-VXLAN-counters basis. Per-VLAN counters are not enabled by default. You need to first run the **enable statistics direction** command for the gateway to enable statistics for specified VLAN IDs.

**statistics**

Displays statistics for the VXLAN gateway. Statistics include transmitted and received packet counts and byte counts. These counters are derived by aggregating tunnel counters for all the tunnels of the gateway.

## Modes

Privileged EXEC mode

## Usage Guidelines

Output includes the gateway name, the system-assigned gateway ID, source IP address, VRF, administration state, and number of tunnels associated.

If you specify the gateway name, the gateway must already be configured.

## Examples

To show the status for a gateway instance that is configured for Layer 2 extension with a loopback interface:

```
device# show overlay-gateway

Overlay Gateway "GW1", ID 1
Type layer2-extension, Admin state up
IP address 10.10.10.1 (Loopback 10), Vrf default-vrf
Number of tunnels 2
Packet count: RX 0           TX 0
Byte count  : RX (NA)       TX 0
```

To show statistics for the gateway instance:

```
device# show overlay-gateway statistics
```

Gateway Name	RX packets	TX packets	RX bytes	TX bytes
GW1	200000	10000	22227772	1110111

show overlay-gateway

To display statistics for VLANs attached to the VXLAN gateway:

```
device# show overlay-gateway name GW1 vlan statistics
```

VLAN	VNI	Tx		Bytes	
		Rx	Packets Tx	Rx	
10	1010	10000	200000	1110111	22227772
11	1011	2200	-	221334	-
21	1021	-	1	-	100

```
sw0# show overlay-gateway name test vlan statistics
```

VLAN ID	RX packets	TX packets
30	0	0
40	3696	3696

## History

Release version	Command history
17r.1.00	This command was introduced.

# show policy-map

Displays configured policy maps and class-map policer parameters applied to the interfaces or globally.

## Syntax

```
show policy-map [ details polycyname | [ {interface ethernet slot/port } | system ] [ input | output ] ]
```

## Parameters

**details** *polycyname*

Displays the detail configuration of the policy map along with binding information.

**interface ethernet** *slot/port*

Specifies a a valid slot and port number for an Ethernet interface.

**system**

Displays the information for the globally-applied policy map.

**input**

Inbound - direction where the policy map is applied.

**output**

Outbound - direction where the policy map is applied.

## Modes

Privileged EXEC mode

## Usage Guidelines

Use this command without identifying an interface and direction of traffic to display policy map binding for all interfaces on the device.

## Command Output

The **show policy-map** command displays the following information:

Output field	Description
Interface	The interface for which rate limiting information is being displayed.
Direction	The traffic direction for which rate limiting is applied.
police-priority-map	Remarkd priority map used for Policer application (802.1 p priority remarked map).
Conform	The traffic in bytes that has been forwarded from this interface that is within the CIR bandwidth limits.
Exceeded	The traffic that has been exceeded the bandwidth available in the CIR limits and has not exceed the EIR limits for this rate-limit policy.
Violated	The traffic that has exceeded the bandwidth available in the CIR and EIR limits.

## Examples

The following example displays the interface-specific policy-map information.

```
device# show policy-map interface ethernet 1/1 in

Ingress Direction :
Policy-Map p2
Class c2
matches 7867567 packets 1007048576 bytes
Police cir 1000000
  Stats:
    Operational cir:1010000 cbs:149999 eir:0 ebs:0
    Conform Byte:1180928 Exceed Byte:0 Violate Byte:1005867648
```

To display policy map binding information for all interfaces:

```
device# show policy-map
Number of policy maps : 46
Policy-Map P1-DEFAULT-RL
  Bound To:None
Policy-Map P2-DEFAULT-RL-10000000000
  Bound To: Eth 1/27(in)
Policy-Map P3-DEFAULT-RL-15000000000
  Bound To:None
```

The following example displays the system-specific policy-map information.

```
device# # show policy-map system map-name pm1

Ingress Direction :
Policy-Map pm1
Class cm1
matches 480661 packets 61524608 bytes
Police cir 100000
  Stats:
    Operational cir:109000 cbs:14999 eir:0 ebs:0
    Conform Byte:265088 Exceed Byte:0 Violate Byte:0
```

## History

Release version	Command history
16r.1.00	This command was introduced.
17r.1.00	Added <b>system</b> option to display globally-applied policy map information.

# show port port-channel ethernet

Displays the detailed LACP attributes that are configured and negotiated with its partner.

## Syntax

```
show port port-channel ethernet port_id
```

## Parameters

*port\_id*

Port to display. Range is from 1 through 1024.

## Modes

Privileged EXEC mode

## Examples

The following example displays the LACP attributes for an Ethernet interface.

```
device# show port port-channel ethernet 0/6
LACP link info: eth 0/6 - 0x118430006
Actor System ID: 0x8000,01-e0-52-00-00-01
Partner System ID: 0x0000,00-00-00-00-00-00
Actor port priority: 0x8000 (32768)
Admin key: 0x0003 (3) Oper key: 0x0003 (3)
Receive machine state : Defaulted
Periodic Transmission machine state : Fast periodic
Mux machine state : Waiting
Admin state: ACT:1 TIM:0 AGG:1 SYN:0 COL:0 DIS:0 DEF:1 EXP:0
Oper state: ACT:1 TIM:0 AGG:1 SYN:0 COL:0 DIS:0 DEF:1 EXP:0
Partner oper state: ACT:0 TIM:1 AGG:1 SYN:1 COL:0 DIS:0 DEF:1 EXP:0
Partner oper port: 0
Selected: :2
Defaulted State Action: No Default-Up
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show port-channel

Displays the Link Aggregation Group (LAG) information for a port-channel.

## Syntax

```
show port-channel [ channel-group-number | detail | load-balance | summary ]
```

## Parameters

*channel-group-number*

Specifies a LAG port channel-group number to display. Range is from 1 through 1024.

**detail**

Displays detailed LAG information for a port-channel.

**load-balance**

Displays the load-balance or frame-distribution scheme among ports in the port-channel.

**summary**

Displays the summary information per channel-group.

## Modes

Privileged EXEC mode

## Usage Guidelines

Use this command to display the LAGs present on the system with details about the LACP counters on their member links. LAG interfaces are called port-channels.

If you do not specify a port-channel, all port-channels are displayed.

When using the **show port-channel** *channel-group-number* command, an asterisk in the command output designates that the designated port channel is the primary link through which the BUM (broadcast, unknown unicast and multicast) traffic flows.

## Examples

The following example displays detailed port-channel information.

```
device# show port-channel detail
Static Aggregator: Po 1
Aggregator type: Standard
```

The following example displays port-channel load-balance information.

```
device port-channel load-balance
Source and Destination IP, MAC address, VID and TCP/UDP port-based load balancing
```

The following example displays the summary output of a port-channel.

```
device# show port-channel summary
Flags: D - Down          P - Up in port-channel

(members)
      U - Up (port-channel)  * - Primary link in port-
channel
      S - Switched
      M - Not in use. Min-links not met
=====
Group Port-channel  Protocol  Member ports
=====
1      Po 1      (D)      None
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show port-security

Displays the configuration information related to port security.

## Syntax

```
show port-security [ addresses | interface ethernet slot/port ]
```

## Modes

Privileged EXEC mode

Interface configuration mode

## Command Output

The **show port-security** command displays the following information:

Output field	Description
Secure Port	The port on which port MAC security is enabled.
MaxSecureAddress (count)	The maximum limit for the number of secure MAC addresses allowed on the interface.
StaticSec (count)	The number of MAC addresses that are manually configured.
Violated	The status that shows whether the port security violation has occurred.
Action	The configured response action that will be taken when a port security violation occurs.
Sticky	The status that shows whether sticky MAC learning is enabled.
Port Security	The status that shows whether port MAC security is enabled.
Port Status	The status of the port.
Violation Mode	The configured response action that will be taken when a port security violation occurs.
Violated	The status that shows whether the port security violation has occurred.
Sticky Enabled	The status that shows whether sticky MAC learning is enabled.
Maximum MAC addresses	The maximum limit for the number of secure MAC addresses allowed on the interface.
Total MAC addresses	The total number of secure MAC addresses learned on the interface.
Configured MAC addresses	The total number of secure MAC addresses configured on the interface manually.
Last violation time	The time when the last port security violation occurred.
Shutdown time (in Minutes)	The configured auto recovery time for port security violation.
Vlan	The VLAN to which the port is mapped.
Mac-address	The secured MAC address.
Type	The types of secure MAC addresses that are used in port MAC security.
Ports	The port on which port MAC security is enabled.



## Examples

To display the port MAC security configuration details across ports on the device, enter the following command:

```
device(conf-if-eth-3/2)# do show port-security
Secure      MaxSecureAddr  CurrentAddr  StaticSec  Violated  Action  Sticky
Port        (count)        (count)      (count)
Eth 3/2     10             0            1          No        Shutdown No
```

To display the statistics of the port MAC security configured for an interface, enter the following command:

```
device(conf-if-eth-3/2)# do show port-security interface ethernet 3/2
Port Security           : Enabled
Port Status             : Up
Violation Mode         : Shutdown
Violated                : No
Sticky Enabled          : No
Maximum MAC addresses  : 10
Total MAC addresses     : 0
Configured MAC addresses : 1
Last violation time     :
Shutdown time (in Minutes) : 0
```

To list the secure MAC addresses configured on the device, enter the following command.

```
device(conf-if-eth-3/2)# do show port-security addresses
Secure Mac Address Table
-----
Vlan      Mac-address      Type              Ports
250       3200.1110.0002   Secure-Static     Eth 3/2
```

# show process cpu

Displays information about the active processes in the switch and their corresponding CPU utilization statistics.

## Syntax

```
show process cpu [ summary ] [ history ] [ top ] [ all-partitions ]
```

## Parameters

### summary

Displays a summary view of cpu usage.

### history

Displays the history of CPU usage.

### top

Displays current CPU utilization.

### all-partitions

Displays a summary view of all partitions.

## Modes

Privileged EXEC mode

## Usage Guidelines

This command is supported only on the local switch.

For an explanation of process states, refer to the UNIX manual page for the **ps** command.

## Examples

To show the information for all processes:

```
device# show process cpu summary
  Realtime Statistics:
Total CPU Utilization: 0% (user procs:0%, system-kernel:0%, iowait:0%)
Load Average: One minute: 0.00; Five minutes: 0.03; Fifteen minutes: 0.01
```

To show CPU usage information by individual processes:

```
device# show process cpu
Realtime Statistics:
Total CPU Utilization: 0% (user procs:0%, system-kernel:0%, iowait:0%)
Load Average: One minute: 0.00; Five minutes: 0.02; Fifteen minutes: 0.00
Active Processes Lifetime Statistic:
  PID  Process          CPU%  State   Started
17169  sh                1.00  S       13:44:27 Jul  1, 2012
 2060  emd               0.80  S       21:52:27 Jun 29, 2012
 2462  SWITCH_TMR_0     0.60  S       21:53:08 Jun 29, 2012
17170  imishow_proc_cp  0.50  S       13:44:27 Jul  1, 2012
 2207  ospfd            0.20  S       21:52:41 Jun 29, 2012
 2211  mstpd            0.20  S       21:52:41 Jun 29, 2012
 2208  rtmd             0.10  S       21:52:41 Jun 29, 2012
(Output truncated)
```

To show the information for all partitions:

```
device# show process cpu all-partitions
Load Average:
L1/0:   2.81   2.27   2.15
L1/1:   2.00   2.00   2.00
L2/0:   2.00   2.01   2.00
L2/1:   2.06   2.03   2.00

Total CPU Utilization (in %):
L1/0:   4.39   0.14   3.83   0.41
L1/1:   0.5    0.00   0.08   0.42
L2/0:   0.49   0.01   0.05   0.44
L2/1:   0.5    0.01   0.05   0.44
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show process info

Displays system processes hierarchically.

## Syntax

```
show process info ]
```

## Command Default

This command is executed on the local switch.

## Modes

Privileged EXEC mode

## Usage Guidelines

Pagination is not supported with this command. Use **more** in the terminal window to display the output one page at a time.

This command is supported only on the local switch.

## Examples

To display system processes hierarchically:

```
device# show process info
```

```
PID      CMD
2        kthreadd
3        \_ migration/0
4        \_ ksoftirqd/0
5        \_ watchdog/0
6        \_ migration/1
7        \_ ksoftirqd/1
8        \_ watchdog/1
9        \_ migration/2
10       \_ ksoftirqd/2
11       \_ watchdog/2
12       \_ migration/3
13       \_ ksoftirqd/3
14       \_ watchdog/3
15       \_ migration/4
16       \_ ksoftirqd/4
17       \_ watchdog/4
18       \_ migration/5
19       \_ ksoftirqd/5
20       \_ watchdog/5
21       \_ migration/6
22       \_ ksoftirqd/6
[Output truncated]
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show process memory

Displays the memory usage information based on processes running in the system.

## Syntax

```
show process memory [ summary ]
```

## Parameters

**summary**

Displays a summary view of memory usage.

## Modes

Privileged EXEC mode

## Usage Guidelines

This command is supported only on the local device.

## Examples

To show memory usage information by individual processes:

```
device# show process memory
%Memory Used: 24.8368%; TotalMemory: 8080312 KB; Total Used: 2006888 KB
Total Free: 6073424 KB; Low Free: 271728 KB; High Free: 4906964 KB; Cached: 747948 KB
  PID  Process      MEM%    VSIZE(KB)    RSS(KB)    PSS(KB)
  6954  hslagtd      3.30     707412      268644     264050
  4405  Dcmd         2.20     385352      182672     152818
  4652  postgres    2.10     216252      173192     143609
  4752  Mcdsd       0.90     235628      75204      47126
  5725  ribmgr      0.80     299724      71828      44743
  6958  fibagt      0.80     246888      69828      42998
  5726  srm         0.80     209512      67516      40639
  5718  nsm         0.60     323520      56376      28656
  5723  ospfd       0.60     326592      54836      27710
  5747  ospf6d      0.60     326364      54488      27389
  5738  arpd        0.60     239348      54328      27438
  5734  mstpd       0.60     214624      51368      24154
  5722  bgpd        0.60     340812      50976      23826
  4647  postgres    0.60     157476      48840      24130
  3623  raslogd     0.50     160440      47968      22327
  5739  iphelpd     0.50     259464      47112      20244
  5729  pimd        0.50     315092      46972      19983
  3640  snmpd       0.50     237116      46656      15292
  5730  mc_hms      0.50     299128      46496      19167
  5727  rpsd        0.50     296804      45580      18620
  5735  vrrpd       0.50     254660      44384      17446
  5750  bfdd        0.50     319116      44348      17457
  2594  confd       0.50         54236      43568      42450
  5724  mctd        0.50     232356      43224      16240
  5732  qosd        0.50     201584      41272      14225
  5744  sflowd     0.50     218208      41192      14140
  5749  tnlmgrd     0.50     220264      40988      14230
  6956  mcagtd      0.50     275560      40444      13511
  5731  ssmd        0.40     203412      40392      13322
  3626  pemd        0.40     229504      39972      9939
  5736  dauthd      0.40     192548      39544      12202
  5742  ptpd        0.40     191572      38372      11763
  5751  ctpd        0.40     205632      38076      11403
  5728  radv        0.40     181964      38060      11246
  5740  onmd        0.40     200644      37940      10597
  5720  l2sysd     0.40     190976      37792      10911
  5737  igmpd       0.40     193056      37576      10373
  5733  lacpd       0.40     183620      37364      10106
  5743  rmond       0.40     183568      37308      10059
  5721  mcast_ssd  0.40     216288      36624      9737
  6955  l2agtd     0.40     210108      36384      9697
  5741  eldd        0.40     188508      36292      9441
  5746  udlld       0.40     188404      36040      9272
  5745  pcapd       0.40     188492      36032      9347
  6959  tnlagtd    0.40     191432      35036      8593
  3630  pdmd        0.40     172824      34352      8118
  6957  qosagtd    0.30     99716      29360      7477
  3642  tsd         0.30     106700      27628      5874
  4877  postgres    0.30     166956      27572      21316
[output omitted, as will vary by device]
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show qos cpu cfg

Displays information about the current CPU protection configuration for individual slots.

## Syntax

```
show qos cpu cfg { slotslot_id } [ burst | shaper | rate ]
```

## Parameters

*slotslot\_id*

Specifies a slot number. The ranges are 0 on pizzabox platforms, 1 through 4 on F4 platforms, and 1 through 8 on F8 platforms.

burst

Specifies port and group traffic burst rates for IPv6 subnet rate limiting.

shaper

Specifies port and group traffic shaper rates for IPv6 subnet rate limiting.

rate

Specifies shaping rate for IPv6 subnet rate limiting.

## Modes

Privileged EXEC mode

## Usage Guidelines

ipv6 subnet-rate-limit



## Examples

To display information about the CPU configuration for slot 1.

```
device# show qos cpu cfg slot 1
Slot 1 CPU QoS Config
```

CPU Port shaper rate: 5000 Kbps

CPU Group shaper rates (Kbps)

Group	Aggr	P0	P1	P2	P3	P4	P5	P6	P7
0	5000	5000	5000	5000	5000	5000	5000	5000	5000
1	5000	5000	5000	5000	5000	5000	5000	5000	5000
2	5000	5000	5000	5000	5000	5000	5000	5000	5000
3	5000	5000	5000	5000	5000	5000	5000	5000	5000
4	5000	5000	5000	5000	5000	5000	5000	5000	5000
5	5000	5000	5000	5000	5000	5000	5000	5000	5000
6	5000	5000	5000	5000	5000	5000	5000	5000	5000
7	5000	5000	5000	5000	5000	5000	5000	5000	5000
8	5000	5000	5000	5000	5000	5000	5000	5000	5000
9	5000	5000	5000	5000	5000	5000	5000	5000	5000
10	5000	5000	5000	5000	5000	5000	5000	5000	5000
11	5000	5000	5000	5000	5000	5000	5000	5000	5000

CPU Port burst size: 1 Kbytes

CPU Group burst size (Kbytes)

Group	Aggr	P0	P1	P2	P3	P4	P5	P6	P7
0	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1
2	1	1	1	1	1	1	1	1	1
3	1	1	1	1	1	1	1	1	1
4	1	1	1	1	1	1	1	1	1
5	1	1	1	1	1	1	1	1	1
6	1	1	1	1	1	1	1	1	1
7	1	1	1	1	1	1	1	1	1
8	1	1	1	1	1	1	1	1	1
9	1	1	1	1	1	1	1	1	1
10	1	1	1	1	1	1	1	1	1
11	1	1	1	1	1	1	1	1	1

CPU Group WFQ values

Group	Aggr	P0	P1	P2	P3	P4	P5	P6	P7
0	1	20	50	50	50	50	50	50	100
1	1	20	50	50	50	50	50	50	100
2	1	20	50	50	50	50	50	50	100
3	1	20	50	50	50	50	50	50	100
4	1	20	50	50	50	50	50	50	100
5	1	20	50	50	50	50	50	50	100
6	1	20	50	50	50	50	50	50	100
7	1	20	50	50	50	50	50	50	100
8	1	20	50	50	50	50	50	50	100
9	1	20	50	50	50	50	50	50	100
10	1	20	50	50	50	50	50	50	100
11	1	20	50	50	50	50	50	50	100

show qos cpu cfg

To display information only about the IPv6 subnet rate-limiting traffic shaper configuration for slot 1.

```
device# show qos cpu cfg slot 1 shaper
Slot 1 CPU QoS Config
```

CPU Port shaper rate: 5000 Kbps

CPU Group shaper rates (Kbps)

Group	Aggr	P0	P1	P2	P3	P4	P5	P6	P7
0	5000	5000	5000	5000	5000	5000	5000	5000	5000
1	5000	5000	5000	5000	5000	5000	5000	5000	5000
2	5000	5000	5000	5000	5000	5000	5000	5000	5000
3	5000	5000	5000	5000	5000	5000	5000	5000	5000
4	5000	5000	5000	5000	5000	5000	5000	5000	5000
5	5000	5000	5000	5000	5000	5000	5000	5000	5000
6	5000	5000	5000	5000	5000	5000	5000	5000	5000
7	5000	5000	5000	5000	5000	5000	5000	5000	5000
8	5000	5000	5000	5000	5000	5000	5000	5000	5000
9	5000	5000	5000	5000	5000	5000	5000	5000	5000
10	5000	5000	5000	5000	5000	5000	5000	5000	5000
11	5000	5000	5000	5000	5000	5000	5000	5000	5000

To display information only about the IPv6 subnet shaping rate configuration for slot 1.

```
device# show qos cpu cfg slot 1 rate
Slot 1 CPU QoS Config
```

Name	Egid	Group	Pkts	Bytes	PPS	bps
Protocol	7f80	0	0	0	0	0
Management	7f81	1				
IP Host	7f82	2	11907	173855778	724	845632
MC RPF Fail	7f83	3	0	0	0	0
MC LHR	7f84	4	0	0	0	0

## History

Release version	Command history
16r.1.01	This command was modified to support IPv6 subnet rate limiting.

# show qos cpu info

Displays information on CPU groups and effective group IDs (EGID).

## Syntax

```
show qos cpu info
```

## Modes

Privileged EXEC mode.

## Examples

To show CPU group information use the following command.

```
device# show qos cpu info
```

Name	Egid	Group	Description
Protocol	7f80	0	Protocol Packets (ARP, L2, etc)
Management	7f81	1	Management (ping, local route)
IP Host	7f82	2	IP Host (subnet route)
MC RPF Fail	7f83	3	Multicast RPF failure
MC LHR	7f84	4	Multicast RP and LHR
MC FHR	7f85	5	Multicast FHR
SFlow Port	7f86	6	SFlow Packets (Port sflow)
SFlow ACL In	7f87	6	ACL sflow ingress permit
SFlow ACL In Deny	7f88	6	ACL sFlow ingress deny
SFlow ACL Eg	7f89	6	ACL sflow egress permit
SFlow ACL Eg Deny	7f8a	6	ACL sflow egress deny
VXLAN Snoop	7f8b	6	VXLAN Visibility Snoop
ACL Log	7f8c	7	ACL Logging
ACL Log In	7f8d	7	ACL Logging ingress permit
ACL Log In Deny	7f8e	7	ACL Logging ingress deny
ACL Log Eg	7f8f	7	ACL Logging egress permit
ACL Log Eg Deny	7f90	7	ACL Logging egress deny
Snoop	7f91	8	Snoop (VxLAN)
Diagnostics	7f92	9	Diagnostics and debug
OAM	7f93	10	OAM and CFM
Openflow	7f94	11	OpenFlow packets
Exceptions	7f96	12	Errors, Exceptions (TTL, MTU)
ICMP Redirect	7f95	12	ICMP Redirect

## History

Release version	Command history
16r.1.00	This command was introduced.

# show qos flowcontrol interface

Displays the configured flow control status for an interface.

## Syntax

```
show qos flowcontrol interface [ all | ethernet slot/port | port-channel number ]
```

## Parameters

**all**

Displays the flow control status on all interfaces in the device.

**ethernet** *slot/port*

Displays the flow control status on the specified interface.

**port-channel** *number*

Displays the flow control status on the interface for the specified port channel.

## Modes

Privileged EXEC mode

## Examples

The following example displays the flow control state of all interfaces on the device.

```
device# show qos flowcontrol interface all
Interface Ethernet 1/1
  Mode Off
Interface Ethernet 1/2
  Mode Off
Interface Ethernet 1/3
  Mode Off
Interface Ethernet 1/4
  Mode Off
...
Interface Ethernet 3/18
  Mode 802.3x
    TX   RX           TX Output Paused   RX
    Admin Admin      Frames  512 BitTimes  Frames
-----
    Off  On           0                0
```

The following example displays the flow control state on a specified interface.

```
device# show qos flowcontrol interface ethernet 3/18
Interface Ethernet 3/18
  Mode 802.3x
    TX   RX           TX Output Paused   RX
    Admin Admin      Frames  512 BitTimes  Frames
-----
    Off  On           0                0
```

## History

Release version	Command history
16r.1.00	This command was introduced.

show qos interface all

# show qos interface all

Displays QoS configuration information about Ethernet, Virtual Ethernet, and port-channel interfaces.

## Syntax

`show qos interface all`

## Modes

Privileged EXEC mode.

## Usage Guidelines

## Examples

To show QoS information for all interfaces use the following command.

```

device show qos interface all
[Note: CoS = Class of Service, TC = Traffic Class, DP = Drop Precedence]
Interface Ve 20
  Provisioning Mode: none

  DSCP Mutation Map: default (DSCP = d1d2)
    d1 : d2 0 1 2 3 4 5 6 7 8 9
    -----
    0 : 00 01 02 03 04 05 06 07 08 09
    1 : 10 11 12 13 14 15 16 17 18 19
    2 : 20 21 22 23 24 25 26 27 28 29
    3 : 30 31 32 33 34 35 36 37 38 39
    4 : 40 41 42 43 44 45 46 47 48 49
    5 : 50 51 52 53 54 55 56 57 58 59
    6 : 60 61 62 63

  DSCP-to-TC Map: default (x/y: TC = x, DP = y, DSCP = d1d2)
    d1 : d2 0 1 2 3 4 5 6 7 8 9
    -----
    0 : 0/0 0/0 0/0 0/0 0/0 0/0 0/0 0/0 0/0 1/0 1/0
    1 : 1/0 1/0 1/0 1/0 1/0 1/0 1/0 2/0 2/0 2/0 2/0
    2 : 2/0 2/0 2/0 2/0 3/0 3/0 3/0 3/0 3/0 3/0 3/0
    3 : 3/0 3/0 4/0 4/0 4/0 4/0 4/0 4/0 4/0 4/0 4/0
    4 : 5/0 5/0 5/0 5/0 5/0 5/0 5/0 5/0 6/0 6/0
    5 : 6/0 6/0 6/0 6/0 6/0 6/0 7/0 7/0 7/0 7/0
    6 : 7/0 7/0 7/0 7/0

  DSCP-to-CoS Map: default (DSCP = d1d2)
    d1 : d2 0 1 2 3 4 5 6 7 8 9
    -----
    0 : 00 00 00 00 00 00 00 00 01 01
    1 : 01 01 01 01 01 01 02 02 02 02
    2 : 02 02 02 02 03 03 03 03 03 03
    3 : 03 03 04 04 04 04 04 04 04 04
    4 : 05 05 05 05 05 05 05 05 06 06
    5 : 06 06 06 06 06 06 07 07 07 07
    6 : 07 07 07 07

  Per Traffic-Class Tail Drop Threshold (bytes)
    TC: 0 1 2 3 4 5 6 7
    -----
  Threshold: 0 0 0 0 0 0 0 0

  Flow control mode Off

  ...

  Traffic Class Scheduler configured for 8 Strict Priority queues
[Note: CoS = Class of Service, TC = Traffic Class, DP = Drop Precedence]
Interface Ethernet 2/125
  Provisioning Mode: none
  Default TC: 0

  CoS-to-TC Map: default
    In-CoS: 0 1 2 3 4 5 6 7
    -----
    Out-TC: 0 1 2 3 4 5 6 7
    Out-DP: 0 0 0 0 0 0 0 0

  TC-to-CoS Map: default
    In-TC: 0 1 2 3 4 5 6 7
    -----

```

show qos interface all

```
Out-CoS (DP=0): 0 1 2 3 4 5 6 7
Out-CoS (DP=1): 0 1 2 3 4 5 6 7
Out-CoS (DP=2): 0 1 2 3 4 5 6 7
Out-CoS (DP=3): 0 1 2 3 4 5 6 7
```

```
DSCP Mutation Map: default (DSCP = d1d2)
d1 : d2 0 1 2 3 4 5 6 7 8 9
-----
0 : 00 01 02 03 04 05 06 07 08 09
1 : 10 11 12 13 14 15 16 17 18 19
2 : 20 21 22 23 24 25 26 27 28 29
3 : 30 31 32 33 34 35 36 37 38 39
4 : 40 41 42 43 44 45 46 47 48 49
5 : 50 51 52 53 54 55 56 57 58 59
6 : 60 61 62 63
```

```
DSCP-to-TC Map: default (x/y: TC = x, DP = y, DSCP = d1d2)
d1 : d2 0 1 2 3 4 5 6 7 8 9
-----
0 : 0/0 0/0 0/0 0/0 0/0 0/0 0/0 0/0 0/0 1/0 1/0
1 : 1/0 1/0 1/0 1/0 1/0 1/0 2/0 2/0 2/0 2/0 2/0
2 : 2/0 2/0 2/0 2/0 3/0 3/0 3/0 3/0 3/0 3/0 3/0
3 : 3/0 3/0 4/0 4/0 4/0 4/0 4/0 4/0 4/0 4/0 4/0
4 : 5/0 5/0 5/0 5/0 5/0 5/0 5/0 5/0 5/0 6/0 6/0
5 : 6/0 6/0 6/0 6/0 6/0 6/0 7/0 7/0 7/0 7/0 7/0
6 : 7/0 7/0 7/0 7/0
```

```
DSCP-to-CoS Map: default (DSCP = d1d2)
d1 : d2 0 1 2 3 4 5 6 7 8 9
-----
0 : 00 00 00 00 00 00 00 00 01 01
1 : 01 01 01 01 01 01 02 02 02 02
2 : 02 02 02 02 03 03 03 03 03 03
3 : 03 03 04 04 04 04 04 04 04 04
4 : 05 05 05 05 05 05 05 05 06 06
5 : 06 06 06 06 06 06 07 07 07 07
6 : 07 07 07 07
```

```
Per Traffic-Class Tail Drop Threshold (bytes)
TC: 0 1 2 3 4 5 6 7
-----
Threshold: 0 0 0 0 0 0 0 0
```

Flow control mode Off

Traffic Class Scheduler configured for 8 Strict Priority queues  
[Note: CoS = Class of Service, TC = Traffic Class, DP = Drop Precedence]  
Interface Ethernet 1/125  
Provisioning Mode: none  
Default TC: 0

```
CoS-to-TC Map: default
In-CoS: 0 1 2 3 4 5 6 7
-----
Out-TC: 0 1 2 3 4 5 6 7
Out-DP: 0 0 0 0 0 0 0 0
```

```
TC-to-CoS Map: default
In-TC: 0 1 2 3 4 5 6 7
-----
Out-CoS (DP=0): 0 1 2 3 4 5 6 7
Out-CoS (DP=1): 0 1 2 3 4 5 6 7
Out-CoS (DP=2): 0 1 2 3 4 5 6 7
Out-CoS (DP=3): 0 1 2 3 4 5 6 7
```

```
DSCP Mutation Map: default (DSCP = d1d2)
d1 : d2 0 1 2 3 4 5 6 7 8 9
-----
0 : 00 01 02 03 04 05 06 07 08 09
1 : 10 11 12 13 14 15 16 17 18 19
2 : 20 21 22 23 24 25 26 27 28 29
3 : 30 31 32 33 34 35 36 37 38 39
```



```

4 :   40 41 42 43 44 45 46 47 48 49
5 :   50 51 52 53 54 55 56 57 58 59
6 :   60 61 62 63

```

DSCP-to-TC Map: default (x/y: TC = x, DP = y, DSCP = d1d2)

```

d1 : d2 0 1 2 3 4 5 6 7 8 9
-----
0 :   0/0 0/0 0/0 0/0 0/0 0/0 0/0 0/0 0/0 1/0 1/0
1 :   1/0 1/0 1/0 1/0 1/0 1/0 2/0 2/0 2/0 2/0 2/0
2 :   2/0 2/0 2/0 2/0 3/0 3/0 3/0 3/0 3/0 3/0 3/0
3 :   3/0 3/0 4/0 4/0 4/0 4/0 4/0 4/0 4/0 4/0 4/0
4 :   5/0 5/0 5/0 5/0 5/0 5/0 5/0 5/0 5/0 6/0 6/0
5 :   6/0 6/0 6/0 6/0 6/0 6/0 7/0 7/0 7/0 7/0 7/0
6 :   7/0 7/0 7/0 7/0

```

DSCP-to-CoS Map: default (DSCP = d1d2)

```

d1 : d2 0 1 2 3 4 5 6 7 8 9
-----
0 :   00 00 00 00 00 00 00 00 00 01 01
1 :   01 01 01 01 01 01 02 02 02 02 02
2 :   02 02 02 02 03 03 03 03 03 03 03
3 :   03 03 04 04 04 04 04 04 04 04 04
4 :   05 05 05 05 05 05 05 05 05 06 06
5 :   06 06 06 06 06 06 07 07 07 07 07
6 :   07 07 07 07

```

Per Traffic-Class Tail Drop Threshold (bytes)

```

TC:   0 1 2 3 4 5 6 7
-----
Threshold: 0 0 0 0 0 0 0 0

```

Flow control mode Off

... <output truncated>

## History

Release version	Command history
16r.1.00	This command was introduced.

show qos interface ethernet

# show qos interface ethernet

Displays QoS configuration information for a specific Ethernet interface.

## Syntax

```
show qos interface ethernet } slot/port
```

## Parameters

*slot/port*

A specific Ethernet interface slot and port number.

## Modes

Privileged EXEC mode.

## Examples

To display the QoS configuration for a specific interface use the following command.

```

device# show qos interface ethernet 1/19
[Note: CoS = Class of Service, TC = Traffic Class, DP = Drop Precedence]
Interface Ethernet 1/19
  Provisioning Mode: none
  Default TC: 0

  CoS-to-TC Map: default
    In-CoS: 0 1 2 3 4 5 6 7
    -----
    Out-TC: 0 1 2 3 4 5 6 7
    Out-DP: 0 0 0 0 0 0 0 0

  TC-to-CoS Map: default
    In-TC: 0 1 2 3 4 5 6 7
    -----
    Out-CoS (DP=0): 0 1 2 3 4 5 6 7
    Out-CoS (DP=1): 0 1 2 3 4 5 6 7
    Out-CoS (DP=2): 0 1 2 3 4 5 6 7
    Out-CoS (DP=3): 0 1 2 3 4 5 6 7

  DSCP Mutation Map: default (DSCP = d1d2)
    d1 : d2 0 1 2 3 4 5 6 7 8 9
    -----
    0 : 00 01 02 03 04 05 06 07 08 09
    1 : 10 11 12 13 14 15 16 17 18 19
    2 : 20 21 22 23 24 25 26 27 28 29
    3 : 30 31 32 33 34 35 36 37 38 39
    4 : 40 41 42 43 44 45 46 47 48 49
    5 : 50 51 52 53 54 55 56 57 58 59
    6 : 60 61 62 63

  DSCP-to-TC Map: default (x/y: TC = x, DP = y, DSCP = d1d2)
    d1 : d2 0 1 2 3 4 5 6 7 8 9
    -----
    0 : 0/0 0/0 0/0 0/0 0/0 0/0 0/0 0/0 0/0 1/0 1/0
    1 : 1/0 1/0 1/0 1/0 1/0 1/0 1/0 2/0 2/0 2/0 2/0
    2 : 2/0 2/0 2/0 2/0 3/0 3/0 3/0 3/0 3/0 3/0 3/0
    3 : 3/0 3/0 4/0 4/0 4/0 4/0 4/0 4/0 4/0 4/0 4/0
    4 : 5/0 5/0 5/0 5/0 5/0 5/0 5/0 5/0 5/0 6/0 6/0
    5 : 6/0 6/0 6/0 6/0 6/0 6/0 6/0 7/0 7/0 7/0 7/0
    6 : 7/0 7/0 7/0 7/0

  DSCP-to-CoS Map: default (DSCP = d1d2)
    d1 : d2 0 1 2 3 4 5 6 7 8 9
    -----
    0 : 00 00 00 00 00 00 00 00 01 01
    1 : 01 01 01 01 01 01 02 02 02 02
    2 : 02 02 02 02 03 03 03 03 03 03
    3 : 03 03 04 04 04 04 04 04 04 04
    4 : 05 05 05 05 05 05 05 05 06 06
    5 : 06 06 06 06 06 06 06 07 07 07
    6 : 07 07 07 07

  Per Traffic-Class Tail Drop Threshold (bytes)
    TC: 0 1 2 3 4 5 6 7
    -----
  Threshold: 0 0 0 0 0 0 0 0

  Flow control mode Off

  Traffic Class Scheduler configured for 8 Strict Priority queues

```

show qos interface ethernet

## History

Release version	Command history
16r.1.00	This command was introduced.

# show qos interface port-channel

Displays QoS configuration information about a specific port channel interface.

## Syntax

```
show qos interface port-channel port_channel_number
```

## Parameters

*port\_channel\_number*

A specific port channel number.

## Modes

Privileged EXEC mode.

## Usage Guidelines

## Examples

Follow this example to view information about the insight interface port channel on MM 1.

```

device# show qos interface port-channel 1
[Note: CoS = Class of Service, TC = Traffic Class, DP = Drop Precedence]
Interface Ethernet 3/125
  Provisioning Mode: none
  Default TC: 0

  CoS-to-TC Map: default
    In-CoS: 0 1 2 3 4 5 6 7
    -----
    Out-TC: 0 1 2 3 4 5 6 7
    Out-DP: 0 0 0 0 0 0 0 0

  TC-to-CoS Map: default
    In-TC: 0 1 2 3 4 5 6 7
    -----
    Out-CoS (DP=0): 0 1 2 3 4 5 6 7
    Out-CoS (DP=1): 0 1 2 3 4 5 6 7
    Out-CoS (DP=2): 0 1 2 3 4 5 6 7
    Out-CoS (DP=3): 0 1 2 3 4 5 6 7

  DSCP Mutation Map: default (DSCP = d1d2)
    d1 : d2 0 1 2 3 4 5 6 7 8 9
    -----
    0 : 00 01 02 03 04 05 06 07 08 09
    1 : 10 11 12 13 14 15 16 17 18 19
    2 : 20 21 22 23 24 25 26 27 28 29
    3 : 30 31 32 33 34 35 36 37 38 39
    4 : 40 41 42 43 44 45 46 47 48 49
    5 : 50 51 52 53 54 55 56 57 58 59
    6 : 60 61 62 63

  DSCP-to-TC Map: default (x/y: TC = x, DP = y, DSCP = d1d2)
    d1 : d2 0 1 2 3 4 5 6 7 8 9
    -----
    0 : 0/0 0/0 0/0 0/0 0/0 0/0 0/0 0/0 0/0 1/0 1/0
    1 : 1/0 1/0 1/0 1/0 1/0 1/0 2/0 2/0 2/0 2/0 2/0
    2 : 2/0 2/0 2/0 2/0 3/0 3/0 3/0 3/0 3/0 3/0 3/0
    3 : 3/0 3/0 4/0 4/0 4/0 4/0 4/0 4/0 4/0 4/0 4/0
    4 : 5/0 5/0 5/0 5/0 5/0 5/0 5/0 5/0 5/0 6/0 6/0
    5 : 6/0 6/0 6/0 6/0 6/0 6/0 6/0 7/0 7/0 7/0 7/0
    6 : 7/0 7/0 7/0 7/0

  DSCP-to-CoS Map: default (DSCP = d1d2)
    d1 : d2 0 1 2 3 4 5 6 7 8 9
    -----
    0 : 00 00 00 00 00 00 00 00 01 01
    1 : 01 01 01 01 01 01 02 02 02 02
    2 : 02 02 02 02 03 03 03 03 03 03
    3 : 03 03 04 04 04 04 04 04 04 04
    4 : 05 05 05 05 05 05 05 05 06 06
    5 : 06 06 06 06 06 06 07 07 07 07
    6 : 07 07 07 07

  Per Traffic-Class Tail Drop Threshold (bytes)
    TC: 0 1 2 3 4 5 6 7
    -----
  Threshold: 0 0 0 0 0 0 0 0

  Flow control mode Off

  Traffic Class Scheduler configured for 8 Strict Priority queues
[Note: CoS = Class of Service, TC = Traffic Class, DP = Drop Precedence]

```

```

Interface Ethernet 2/125
  Provisioning Mode: none
  Default TC: 0

  CoS-to-TC Map: default
    In-CoS: 0 1 2 3 4 5 6 7
    -----
    Out-TC: 0 1 2 3 4 5 6 7
    Out-DP: 0 0 0 0 0 0 0 0

  TC-to-CoS Map: default
    In-TC: 0 1 2 3 4 5 6 7
    -----
    Out-CoS (DP=0): 0 1 2 3 4 5 6 7
    Out-CoS (DP=1): 0 1 2 3 4 5 6 7
    Out-CoS (DP=2): 0 1 2 3 4 5 6 7
    Out-CoS (DP=3): 0 1 2 3 4 5 6 7

  DSCP Mutation Map: default (DSCP = d1d2)
    d1 : d2 0 1 2 3 4 5 6 7 8 9
    -----
    0 : 00 01 02 03 04 05 06 07 08 09
    1 : 10 11 12 13 14 15 16 17 18 19
    2 : 20 21 22 23 24 25 26 27 28 29
    3 : 30 31 32 33 34 35 36 37 38 39
    4 : 40 41 42 43 44 45 46 47 48 49
    5 : 50 51 52 53 54 55 56 57 58 59
    6 : 60 61 62 63

  DSCP-to-TC Map: default (x/y: TC = x, DP = y, DSCP = d1d2)
    d1 : d2 0 1 2 3 4 5 6 7 8 9
    -----
    0 : 0/0 0/0 0/0 0/0 0/0 0/0 0/0 0/0 0/0 1/0 1/0
    1 : 1/0 1/0 1/0 1/0 1/0 1/0 2/0 2/0 2/0 2/0 2/0
    2 : 2/0 2/0 2/0 2/0 3/0 3/0 3/0 3/0 3/0 3/0 3/0
    3 : 3/0 3/0 4/0 4/0 4/0 4/0 4/0 4/0 4/0 4/0 4/0
    4 : 5/0 5/0 5/0 5/0 5/0 5/0 5/0 5/0 5/0 6/0 6/0
    5 : 6/0 6/0 6/0 6/0 6/0 6/0 7/0 7/0 7/0 7/0 7/0
    6 : 7/0 7/0 7/0 7/0

  DSCP-to-CoS Map: default (DSCP = d1d2)
    d1 : d2 0 1 2 3 4 5 6 7 8 9
    -----
    0 : 00 00 00 00 00 00 00 00 01 01
    1 : 01 01 01 01 01 01 02 02 02 02
    2 : 02 02 02 02 03 03 03 03 03 03
    3 : 03 03 04 04 04 04 04 04 04 04
    4 : 05 05 05 05 05 05 05 05 06 06
    5 : 06 06 06 06 06 06 07 07 07 07
    6 : 07 07 07 07

  Per Traffic-Class Tail Drop Threshold (bytes)
    TC: 0 1 2 3 4 5 6 7
    -----
  Threshold: 0 0 0 0 0 0 0 0

  Flow control mode Off

  Traffic Class Scheduler configured for 8 Strict Priority queues
  [Note: CoS = Class of Service, TC = Traffic Class, DP = Drop Precedence]
Interface Ethernet 1/125
  Provisioning Mode: none
  Default TC: 0

  CoS-to-TC Map: default
    In-CoS: 0 1 2 3 4 5 6 7
    -----
    Out-TC: 0 1 2 3 4 5 6 7
    Out-DP: 0 0 0 0 0 0 0 0

  TC-to-CoS Map: default
    In-TC: 0 1 2 3 4 5 6 7

```

show qos interface port-channel

```
-----
Out-CoS (DP=0): 0 1 2 3 4 5 6 7
Out-CoS (DP=1): 0 1 2 3 4 5 6 7
Out-CoS (DP=2): 0 1 2 3 4 5 6 7
Out-CoS (DP=3): 0 1 2 3 4 5 6 7

DSCP Mutation Map: default (DSCP = d1d2)
d1 : d2 0 1 2 3 4 5 6 7 8 9
-----
0 : 00 01 02 03 04 05 06 07 08 09
1 : 10 11 12 13 14 15 16 17 18 19
2 : 20 21 22 23 24 25 26 27 28 29
3 : 30 31 32 33 34 35 36 37 38 39
4 : 40 41 42 43 44 45 46 47 48 49
5 : 50 51 52 53 54 55 56 57 58 59
6 : 60 61 62 63

DSCP-to-TC Map: default (x/y: TC = x, DP = y, DSCP = d1d2)
d1 : d2 0 1 2 3 4 5 6 7 8 9
-----
0 : 0/0 0/0 0/0 0/0 0/0 0/0 0/0 0/0 1/0 1/0
1 : 1/0 1/0 1/0 1/0 1/0 1/0 1/0 2/0 2/0 2/0
2 : 2/0 2/0 2/0 2/0 3/0 3/0 3/0 3/0 3/0 3/0
3 : 3/0 3/0 4/0 4/0 4/0 4/0 4/0 4/0 4/0 4/0
4 : 5/0 5/0 5/0 5/0 5/0 5/0 5/0 5/0 6/0 6/0
5 : 6/0 6/0 6/0 6/0 6/0 6/0 7/0 7/0 7/0 7/0
6 : 7/0 7/0 7/0 7/0

DSCP-to-CoS Map: default (DSCP = d1d2)
d1 : d2 0 1 2 3 4 5 6 7 8 9
-----
0 : 00 00 00 00 00 00 00 00 01 01
1 : 01 01 01 01 01 01 02 02 02 02
2 : 02 02 02 02 03 03 03 03 03 03
3 : 03 03 04 04 04 04 04 04 04 04
4 : 05 05 05 05 05 05 05 05 06 06
5 : 06 06 06 06 06 06 07 07 07 07
6 : 07 07 07 07

Per Traffic-Class Tail Drop Threshold (bytes)
TC: 0 1 2 3 4 5 6 7
-----
Threshold: 0 0 0 0 0 0 0 0

Flow control mode Off

Traffic Class Scheduler configured for 8 Strict Priority queues
```



Follow this example to view information about a specific port channel interface.

```

device# show qos interface port-channel 20
[Note: CoS = Class of Service, TC = Traffic Class, DP = Drop Precedence]
Interface Ethernet 3/48
  Provisioning Mode: none
  Default TC: 0

  CoS-to-TC Map: default
    In-CoS: 0 1 2 3 4 5 6 7
    -----
    Out-TC: 0 1 2 3 4 5 6 7
    Out-DP: 0 0 0 0 0 0 0 0

  TC-to-CoS Map: default
    In-TC: 0 1 2 3 4 5 6 7
    -----
    Out-CoS (DP=0): 0 1 2 3 4 5 6 7
    Out-CoS (DP=1): 0 1 2 3 4 5 6 7
    Out-CoS (DP=2): 0 1 2 3 4 5 6 7
    Out-CoS (DP=3): 0 1 2 3 4 5 6 7

  DSCP Mutation Map: default (DSCP = d1d2)
    d1 : d2 0 1 2 3 4 5 6 7 8 9
    -----
    0 : 00 01 02 03 04 05 06 07 08 09
    1 : 10 11 12 13 14 15 16 17 18 19
    2 : 20 21 22 23 24 25 26 27 28 29
    3 : 30 31 32 33 34 35 36 37 38 39
    4 : 40 41 42 43 44 45 46 47 48 49
    5 : 50 51 52 53 54 55 56 57 58 59
    6 : 60 61 62 63

  DSCP-to-TC Map: default (x/y: TC = x, DP = y, DSCP = d1d2)
    d1 : d2 0 1 2 3 4 5 6 7 8 9
    -----
    0 : 0/0 0/0 0/0 0/0 0/0 0/0 0/0 0/0 0/0 1/0 1/0
    1 : 1/0 1/0 1/0 1/0 1/0 1/0 1/0 2/0 2/0 2/0 2/0
    2 : 2/0 2/0 2/0 2/0 3/0 3/0 3/0 3/0 3/0 3/0 3/0
    3 : 3/0 3/0 4/0 4/0 4/0 4/0 4/0 4/0 4/0 4/0 4/0
    4 : 5/0 5/0 5/0 5/0 5/0 5/0 5/0 5/0 5/0 6/0 6/0
    5 : 6/0 6/0 6/0 6/0 6/0 6/0 6/0 7/0 7/0 7/0 7/0
    6 : 7/0 7/0 7/0 7/0

  DSCP-to-CoS Map: default (DSCP = d1d2)
    d1 : d2 0 1 2 3 4 5 6 7 8 9
    -----
    0 : 00 00 00 00 00 00 00 00 00 01 01
    1 : 01 01 01 01 01 01 01 02 02 02 02
    2 : 02 02 02 02 03 03 03 03 03 03 03
    3 : 03 03 04 04 04 04 04 04 04 04 04
    4 : 05 05 05 05 05 05 05 05 05 06 06
    5 : 06 06 06 06 06 06 06 07 07 07 07
    6 : 07 07 07 07

  Per Traffic-Class Tail Drop Threshold (bytes)
    TC: 0 1 2 3 4 5 6 7
    -----
  Threshold: 0 0 0 0 0 0 0 0

  Flow control mode Off

  Per Traffic-Class Tail Drop Threshold (bytes)
    TC: 0 1 2 3 4 5 6 7
    -----
  Threshold: 0 0 0 0 0 0 0 0

  Flow control mode Off

  Traffic Class Scheduler configured for 8 Strict Priority queues

```

show qos interface port-channel

[Note: CoS = Class of Service, TC = Traffic Class, DP = Drop Precedence]

Interface Ethernet 3/2

Provisioning Mode: none

Default TC: 0

CoS-to-TC Map: default

In-CoS: 0 1 2 3 4 5 6 7

-----  
Out-TC: 0 1 2 3 4 5 6 7

Out-DP: 0 0 0 0 0 0 0 0

TC-to-CoS Map: default

In-TC: 0 1 2 3 4 5 6 7

-----  
Out-CoS (DP=0): 0 1 2 3 4 5 6 7

Out-CoS (DP=1): 0 1 2 3 4 5 6 7

Out-CoS (DP=2): 0 1 2 3 4 5 6 7

Out-CoS (DP=3): 0 1 2 3 4 5 6 7

DSCP Mutation Map: default (DSCP = d1d2)

d1 : d2 0 1 2 3 4 5 6 7 8 9

-----  
0 : 00 01 02 03 04 05 06 07 08 09

1 : 10 11 12 13 14 15 16 17 18 19

2 : 20 21 22 23 24 25 26 27 28 29

3 : 30 31 32 33 34 35 36 37 38 39

4 : 40 41 42 43 44 45 46 47 48 49

5 : 50 51 52 53 54 55 56 57 58 59

6 : 60 61 62 63

DSCP-to-TC Map: default (x/y: TC = x, DP = y, DSCP = d1d2)

d1 : d2 0 1 2 3 4 5 6 7 8 9

-----  
0 : 0/0 0/0 0/0 0/0 0/0 0/0 0/0 0/0 0/0 1/0 1/0

1 : 1/0 1/0 1/0 1/0 1/0 1/0 2/0 2/0 2/0 2/0 2/0

2 : 2/0 2/0 2/0 2/0 3/0 3/0 3/0 3/0 3/0 3/0 3/0

3 : 3/0 3/0 4/0 4/0 4/0 4/0 4/0 4/0 4/0 4/0 4/0

4 : 5/0 5/0 5/0 5/0 5/0 5/0 5/0 5/0 6/0 6/0 6/0

5 : 6/0 6/0 6/0 6/0 6/0 6/0 7/0 7/0 7/0 7/0 7/0

6 : 7/0 7/0 7/0 7/0

DSCP-to-CoS Map: default (DSCP = d1d2)

d1 : d2 0 1 2 3 4 5 6 7 8 9

-----  
0 : 00 00 00 00 00 00 00 00 01 01

1 : 01 01 01 01 01 01 02 02 02 02

2 : 02 02 02 02 03 03 03 03 03 03

3 : 03 03 04 04 04 04 04 04 04 04

4 : 05 05 05 05 05 05 05 05 06 06

5 : 06 06 06 06 06 06 07 07 07 07

6 : 07 07 07 07

Per Traffic-Class Tail Drop Threshold (bytes)

TC: 0 1 2 3 4 5 6 7

-----  
Threshold: 0 0 0 0 0 0 0 0

Flow control mode Off

...<output truncated>

Traffic Class Scheduler configured for 8 Strict Priority queues

[Note: CoS = Class of Service, TC = Traffic Class, DP = Drop Precedence]

Interface Ethernet 1/41

Provisioning Mode: none

Default TC: 0

CoS-to-TC Map: default

In-CoS: 0 1 2 3 4 5 6 7

-----  
Out-TC: 0 1 2 3 4 5 6 7

Out-DP: 0 0 0 0 0 0 0 0

```

TC-to-CoS Map: default
      In-TC: 0  1  2  3  4  5  6  7
-----
Out-CoS (DP=0): 0  1  2  3  4  5  6  7
Out-CoS (DP=1): 0  1  2  3  4  5  6  7
Out-CoS (DP=2): 0  1  2  3  4  5  6  7
Out-CoS (DP=3): 0  1  2  3  4  5  6  7

DSCP Mutation Map: default (DSCP = d1d2)
d1 : d2 0  1  2  3  4  5  6  7  8  9
-----
0 :   00 01 02 03 04 05 06 07 08 09
1 :   10 11 12 13 14 15 16 17 18 19
2 :   20 21 22 23 24 25 26 27 28 29
3 :   30 31 32 33 34 35 36 37 38 39
4 :   40 41 42 43 44 45 46 47 48 49
5 :   50 51 52 53 54 55 56 57 58 59
6 :   60 61 62 63

DSCP-to-TC Map: default (x/y: TC = x, DP = y, DSCP = d1d2)
d1 : d2 0  1  2  3  4  5  6  7  8  9
-----
0 :   0/0 0/0 0/0 0/0 0/0 0/0 0/0 0/0 0/0 1/0 1/0
1 :   1/0 1/0 1/0 1/0 1/0 1/0 2/0 2/0 2/0 2/0 2/0
2 :   2/0 2/0 2/0 2/0 2/0 3/0 3/0 3/0 3/0 3/0 3/0
3 :   3/0 3/0 4/0 4/0 4/0 4/0 4/0 4/0 4/0 4/0 4/0
4 :   5/0 5/0 5/0 5/0 5/0 5/0 5/0 5/0 5/0 6/0 6/0
5 :   6/0 6/0 6/0 6/0 6/0 6/0 7/0 7/0 7/0 7/0 7/0
6 :   7/0 7/0 7/0 7/0

DSCP-to-CoS Map: default (DSCP = d1d2)
d1 : d2 0  1  2  3  4  5  6  7  8  9
-----
0 :   00 00 00 00 00 00 00 00 01 01
1 :   01 01 01 01 01 01 02 02 02 02
2 :   02 02 02 02 03 03 03 03 03 03
3 :   03 03 04 04 04 04 04 04 04 04
4 :   05 05 05 05 05 05 05 05 06 06
5 :   06 06 06 06 06 06 07 07 07 07
6 :   07 07 07 07

Per Traffic-Class Tail Drop Threshold (bytes)
      TC:      0      1      2      3      4      5      6      7
-----
Threshold:    0      0      0      0      0      0      0      0

```

Flow control mode Off

Traffic Class Scheduler configured for 8 Strict Priority queues

## History

Release version	Command history
16r.1.00	This command was introduced.

show qos interface ve

# show qos interface ve

Displays QoS configuration information about a specific Virtual Ethernet interface.

## Syntax

```
show qos interface ve ve_number
```

## Parameters

*ve\_number*

A specific Virtual Ethernet number.

## Modes

Privileged EXEC mode.

## Examples

Follow this example to view information about a specific VE interface.

```

device# show qos interface ve 20
[Note: CoS = Class of Service, TC = Traffic Class, DP = Drop Precedence]
Interface Ve 20
  Provisioning Mode: none

  DSCP Mutation Map: default (DSCP = d1d2)
    d1 : d2 0  1  2  3  4  5  6  7  8  9
    -----
    0 :    00 01 02 03 04 05 06 07 08 09
    1 :    10 11 12 13 14 15 16 17 18 19
    2 :    20 21 22 23 24 25 26 27 28 29
    3 :    30 31 32 33 34 35 36 37 38 39
    4 :    40 41 42 43 44 45 46 47 48 49
    5 :    50 51 52 53 54 55 56 57 58 59
    6 :    60 61 62 63

  DSCP-to-TC Map: default (x/y: TC = x, DP = y, DSCP = d1d2)
    d1 : d2 0  1  2  3  4  5  6  7  8  9
    -----
    0 :    0/0 0/0 0/0 0/0 0/0 0/0 0/0 0/0 0/0 1/0 1/0
    1 :    1/0 1/0 1/0 1/0 1/0 1/0 2/0 2/0 2/0 2/0 2/0
    2 :    2/0 2/0 2/0 2/0 3/0 3/0 3/0 3/0 3/0 3/0 3/0
    3 :    3/0 3/0 4/0 4/0 4/0 4/0 4/0 4/0 4/0 4/0 4/0
    4 :    5/0 5/0 5/0 5/0 5/0 5/0 5/0 5/0 5/0 6/0 6/0
    5 :    6/0 6/0 6/0 6/0 6/0 6/0 7/0 7/0 7/0 7/0 7/0
    6 :    7/0 7/0 7/0 7/0

  DSCP-to-CoS Map: default (DSCP = d1d2)
    d1 : d2 0  1  2  3  4  5  6  7  8  9
    -----
    0 :    00 00 00 00 00 00 00 00 00 01 01
    1 :    01 01 01 01 01 01 02 02 02 02 02
    2 :    02 02 02 02 03 03 03 03 03 03 03
    3 :    03 03 04 04 04 04 04 04 04 04 04
    4 :    05 05 05 05 05 05 05 05 05 06 06
    5 :    06 06 06 06 06 06 07 07 07 07 07
    6 :    07 07 07 07

  Per Traffic-Class Tail Drop Threshold (bytes)
    TC:          0      1      2      3      4      5      6      7
    -----
  Threshold:    0      0      0      0      0      0      0      0

```

Flow control mode Off

Traffic Class Scheduler configured for 8 Strict Priority queues

## History

Release version	Command history
16r.1.00	This command was introduced.

# show qos maps cos-traffic-class

Displays configured t CoS-to-traffic class mutation maps.

## Syntax

`show qos maps cos-traffic-class`

## Modes

Privileged EXEC mode.

## Examples

To display information on defined QoS CoS-to-traffic class mutation maps and where they are applied, use this command.

```
device# show qos maps cos-traffic-class

Cos-to-Traffic Class map 'cosTCMap'
In-Cos      : 0 1 2 3 4 5 6 7
-----
TrafficClass : 0 1 2 3 3 6 6 6
DropPrecedence: 0 0 0 0 0 1 0 1

Enabled on the following interfaces:
  Eth 1/4
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show qos maps dscp-cos

Displays configured DSCP to CoS mutation maps.

## Syntax

```
show qos maps dscp-cos
```

## Modes

Privileged EXEC mode

## Examples

To display information on defined QoS DSCP to CoS mutation maps and where they are applied, use this command.

```
device# show qos maps dscp-cos

Dscp-to-CoS map 'dscpCoS' (dscp= d1d2)
d1 : d2 0 1 2 3 4 5 6 7 8 9
-----
0 : 00 00 00 00 00 00 00 00 01 01
1 : 01 01 01 01 01 01 02 02 02 02
2 : 02 02 02 04 03 03 03 03 03 03
3 : 03 03 04 04 04 04 04 04 04 04
4 : 05 05 05 05 05 05 05 05 06 06
5 : 06 06 06 06 06 06 07 07 07 07
6 : 07 07 07 07
```

```
Enabled on the following interfaces:
Eth 1/3
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show qos maps dscp-mutation

Displays configured DSCP mutation maps.

## Syntax

```
show qos maps dscp-mutation [ map-name ]
```

## Parameters

*map-name*

Displays the specified DSCP mutation map.

## Modes

Privileged EXEC mode

## Examples

To display information on defined QoS DSCP mutation maps and where they are applied, use this command.

```
device# show qos maps dscp-mutation

Dscp-to-Dscp Mutation map 'dscpMut' (dscp= d1d2)
d1 : d2 0  1  2  3  4  5  6  7  8  9
-----
0 :   00 01 02 03 04 05 06 07 08 09
1 :   10 11 12 13 14 15 16 17 18 19
2 :   20 21 22 23 24 25 26 27 28 29
3 :   30 31 32 33 34 35 36 37 38 39
4 :   40 41 42 43 44 45 46 47 48 49
5 :   50 51 52 53 54 55 56 57 58 59
6 :   40 61 62 63
```

Enabled on the following interfaces:  
Eth 1/3

## History

Release version	Command history
16r.1.00	This command was introduced.



# show qos maps dscp-traffic-class

Displays configured DSCP to traffic class mutation maps.

## Syntax

```
show qos maps dscp-traffic-class
```

## Modes

Privileged EXEC mode

## Examples

To display information on defined QoS DSCP to traffic class mutation maps and where they are applied, use this command.

```
device# show qos maps dscp-traffic-class

Dscp-to-Traffic-Class map 'dscpTC'
{x/y: traffic-class = x, drop-precedence = y & dscp = d1d2}
d1 : d2  0   1   2   3   4   5   6   7   8   9
-----
0 :      0/0 0/0 0/0 0/0 0/0 0/0 0/0 0/0 4/2 1/0
1 :      1/0 1/0 1/0 1/0 1/0 1/0 2/0 2/0 2/0 2/0
2 :      2/0 2/0 2/0 2/0 3/0 3/0 3/0 3/0 3/0 3/0
3 :      3/0 3/0 4/0 4/0 4/0 4/0 4/0 4/0 4/0 4/0
4 :      5/0 5/0 5/0 5/0 5/0 5/0 5/0 5/0 6/0 6/0
5 :      6/0 6/0 6/0 6/0 6/0 6/0 7/0 7/0 7/0 7/0
6 :      7/0 7/0 7/0 7/0
```

```
Enabled on the following interfaces:
Eth 1/4
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show qos maps traffic-class-cos

Displays configured traffic class to CoS mutation maps.

## Syntax

`show qos maps traffic-class-cos`

## Modes

Privileged EXEC mode

## Examples

To display information on defined QoS DSCP to traffic class to CoS mutation maps and where they are applied, use this command.

```
device# show qos maps traffic-class-cos

Traffic Class-to-Cos map 'tcCoS' (drop-precedence = dp0 to dp3)
TrafficClass : 0 1 2 3 4 5 6 7
-----
Out-Cos (dp0) : 0 1 2 3 4 5 6 7
Out-Cos (dp1) : 0 1 2 3 4 5 6 7
Out-Cos (dp2) : 0 1 2 3 4 4 6 7
Out-Cos (dp3) : 0 1 2 3 4 5 6 7

Enabled on the following interfaces:
Eth 1/4
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show qos-mpls maps dscp-exp

Displays configured QoS Multiprotocol Label Switching (MPLS) DSCP to EXP egress mutation maps.

## Syntax

```
show qos-mpls maps dscp-exp
```

## Modes

Privileged EXEC mode.

## Examples

To display information on defined QoS MPLS DSCP to EXP egress mutation maps and where they are applied, use this command.

```
device# show qos-mpls maps dscp-exp

dscp-exp map      'dscpExp' (dscp= d1d2)
d1      : d2 0  1  2  3  4  5  6  7  8  9
-----
0      :    0  0  2  0  0  0  0  0  0  1  1
1      :    1  1  1  1  1  1  2  2  2  2  2
2      :    2  2  2  2  3  3  3  3  3  3  3
3      :    3  3  4  4  4  4  4  4  4  4  4
4      :    5  5  5  5  5  5  5  5  6  6  6
5      :    6  6  6  6  6  6  7  7  7  7  7
6      :    7  7  7  0
```

```
Enabled on the following slots:
Eth 1/4
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show qos-mpls maps exp-dscp

Displays configured QoS Multiprotocol Label Switching (MPLS) EXP to DSCP mutation maps.

## Syntax

`show qos-mpls maps exp-dscp`

## Modes

Privileged EXEC mode.

## Examples

To display information on defined QoS MPLS EXP to DSCP mutation maps and where they are applied, use this command.

```
device# show qos-mpls maps exp-dscp

exp-dscp map 'expDSCP'
  Exp   : 0 1 2 3 4 5 6 7
  -----
  DSCP  : 0 2 4 3 6 4 5 7

Enabled on the following slots:
  Eth 1/4
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show qos-mpls maps exp-traffic-class

Displays configured QoS Multiprotocol Label Switching (MPLS) EXP to traffic class mutation maps.

## Syntax

```
show qos-mpls maps exp-traffic-class
```

## Modes

Privileged EXEC mode.

## Examples

To display information on defined QoS MPLS EXP to traffic class mutation maps and where they are applied, use this command.

```
device# show qos-mpls maps exp-traffic-class
```

```
exp-traffic-class map 'expTc'
  Exp      :   0  1  2  3  4  5  6  7
  -----
traffic-class : 5  5  4  6  5  5  5  5
drop-precedence: 0  1  1  1  0  2  2  1
```

```
Enabled on the following slots:
  Eth 1/4
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show qos-mpls maps traffic-class-exp

Displays configured QoS Multiprotocol Label Switching (MPLS) traffic class to EXP mutation maps.

## Syntax

`show qos-mpls maps traffic-class-exp`

## Modes

Privileged EXEC mode.

## Examples

To display information on defined QoS MPLS traffic class to EXP mutation maps and where they are applied, use this command.

```
device# show qos-mpls maps traffic-class-exp

traffic-class-exp map 'tcExp' (Drop-Precedence = dp)
dp: traffic-class : 0 1 2 3 4 5 6 7
-----
0: exp           : 0 1 2 3 4 0 6 7
1:               : 0 1 2 3 4 5 6 5
2:               : 0 1 2 3 4 5 6 7
3:               : 0 1 2 3 4 5 6 7

Enabled on the following slots:
  Eth 1/4
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show route-map

Displays the PBR configuration details.

## Syntax

```
show route-map [ name | interface { ethernet slot/port | ve ve-number } ]
```

## Parameters

*name*

The name of the route-map.

**interface** { **ethernet** *slot/port*

Specifies the route-map configuration details on a specific interface.

**ve** *ve-number*

Specifies the route-map configuration details on a virtual Ethernet interface.

## Modes

Privileged EXEC mode

## Command Output

The **show port-security** command displays the following information:

Output field	Description
Active/Partial/Inactive	Indicates the instantiation of the route-map configuration into the underlying hardware. Possible meanings for inactive may be no room in the TCAM for programming the ACL, or the exhaustion of next-hop entries within the hardware next-hop table.
Selected	Indicates which of the configured next hops is currently being used by the policy. If the keyword selected is absent from the display, it indicates that none of the next hops in the list is being used and the packet is being routed by the standard routing mechanism.
Policy routing matches	Provides a summary of the number of times any of the match criteria within the specific ACL have been hit. If the ACL binding was unable to allocate a counter for the ACL (due to resource exhaustion) the count value will show "Counter not available" otherwise an actual counter value will be displayed.

## Examples

To display the route map information, enter the following command.

```
device# show route-map
Interface Ethernet 1/6
  ip policy route-map route1
```

To display the details of the configured routing attributes, enter the following command.

```
device# show route-map routel
Interface Ethernet 1/6
ip policy route-map routel permit 1 (Active)
  match ip address acl test1
  set ip next-hop 6.0.0.1 (selected)
Policy routing matches: 1443 packets
```

To display the route-map configuration details on a specific interface, enter the following command.

```
device# show route-map interface ethernet 1/6
Interface Ethernet 1/6
ip policy route-map routel permit 1 (Active)
  match ip address acl test1
  set ip next-hop 6.0.0.1 (selected)
Policy routing matches: 1543 packets
```



# show rmon

Displays the current RMON status on the device.

## Syntax

```
show rmon [alarms [number] [brief]] | events [number] [brief] | logs [event_number] | statistics [number] [brief]
```

## Parameters

### alarms

Specifies to display the RMON alarm table.

*number*

Specifies the alarm index identification number. Valid values range from 1 through 65535.

**brief**

Specifies to display a brief summary of the output.

### events

Specifies to display the RMON events table.

*number*

Specifies the event index identification number. Valid values range from 1 through 65535.

**brief**

Specifies to display a brief summary of the output.

### logs

Specifies to display the RMON log table.

*event\_number*

Specifies the event log index identification number. Valid values range from 1 through 65535.

### statistics

Specifies to display the statistics identification number.

*number*

Specifies the statistics identification number. Valid values range from 1 through 65535.

**brief**

Specifies a brief summary of the output.

## Modes

Privileged EXEC mode

## Examples

To display the RMON statistics:

```
device# show rmon statistics

rmon collection index 4
  Interface index is Id: 67108864 , Name : Ethernet 0/13
  Receive Statistics:
    218903 packets, 14015626 bytes,  0 packs dropped
    Multicasts: 218884, Broadcasts: 18
    Under-size : 0, Jabbers: 0, CRC: 0
    Fragments: 0, Collisions: 0
      64 byte pkts: 218722, 65-127 byte pkts: 174
    128-255 byte pkts: 0, 256-511 byte pkts: 6
    512-1023 byte pkts: 0, 1024-1518 byte pkts: 0
    Over 1518-byte pkts(Oversize - Jumbo): 0
  Owner: RMON_SNMP
  Status: ok(1)
```

To display the RMON events:

```
device# show rmon events

event Index = 4
  Description "My Description"
  Event type Log & SnmpTrap
  Event community name admin
  Last Time Sent = 00:00:00
  Owner admin
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show rmon history

Displays information gathered by rmon event and rmon alarm commands.

## Syntax

```
show rmon history [ statistics | history_index ]
```

## Parameters

### statistics

Displays a more detailed synopsis.

### history\_index

Specifies the RMON history identification number. Valid values range from 1 through 65535.

## Modes

Privileged EXEC mode

## Usage Guidelines

Use this command to display a synopsis of the statistics collected by the **rmon event** and **rmon alarm** commands.

Add the **statistics** parameter to display the detailed history.

## Examples

To display the RMON history:

```
device# show rmon history

RMON history control entry 1
interface: ifIndex.1745682445 Ethernet 0/13
buckets requested: 20
buckets granted: 20
sampling interval: 10
Owner: jsmith
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show run router mpls cspf-group

Displays the CSPF fate-sharing group configuration for all groups configured on a device.

## Syntax

```
show run router mpls cspg-group group_name [ from | link | node [ ip_addr ] ] | subnet ip_addr/mask ]
```

## Parameters

**from** *ip\_addr*

Configures the CSPF group from the specified IP address.

**link** *ip\_addr*

Configures the CSPF group from and to the specified IP address.

**node** *ip\_addr*

Configures the CSPF group node IP address.

**subnet** *ip\_addr/mask*

Configures the CSPF group subnet address.

## Modes

EXEC mode.

## Examples

The following example displays the fate-sharing group configuration for all groups currently configured on the device.

```
device# show run router mpls cspf-group gold
cspf-group test8
penalty 65535
node 10.7.7.3
node 10.7.7.8
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show running-config

Displays the contents of the running configuration.

## Syntax

```
show running-config
```

## Parameters

Refer to the Usage Guidelines.

## Modes

Privileged EXEC mode

## Usage Guidelines

Use this command to display the running configuration. This is the configuration that is currently active on the local device but which is not saved persistently.

This command is supported only on the local device.

Enter **show running-config ?** to display the list of available configuration entries.

## Examples

The following command example displays the contents of the running configuration.

```
device# show running-config
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show running-config aaa

Displays the configuration attributes for the authentication, authorization, and accounting (AAA) server from the configuration database.

## Syntax

```
show running-config aaa [ accounting [ commands | exec ] | authentication [ login ] ]
```

## Parameters

### accounting

Configures Login or Command accounting

### commands

Enable/Disable Command accounting

### exec

Enable/Disable Login accounting

### authentication

Configures preferred order of Authentication output modifiers

### login

Configures the order of sources for login (default = 'local')

## Modes

Privileged EXEC mode

## Usage Guidelines

Refer to the **aaa authentication** command for a description of the displayed attributes.

## Examples

To display the authentication mode:

```
device# show running-config aaa
aaa authentication radius local
aaa accounting exec default start-stop none
aaa accounting commands default start-stop none

device# show running-config aaa authentication
aaa authentication login radius local

device# show running-config aaa authentication
aaa authentication login ldap local-auth-fallback
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show running-config aaa accounting

Displays the AAA server accounting configuration.

## Syntax

`show running-config aaa accounting`

## Modes

Privileged EXEC mode

## Usage Guidelines

Refer to the **aaa authentication** command for a description of the displayed attributes.

## Examples

To displaying the authentication mode:

```
device# show running-config aaa accounting
aaa accounting exec default start-stop tacacs+
aaa accounting commands default start-stop tacacs+
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# show running-config arp

Displays static ARP entries created in the running configuration, using the **arp** command, with an option to display ARP ACLs.

## Syntax

```
show running-config arp
```

```
show running-config arp ip-address [ ethernet slot / port | ve ve-id ]
```

```
show running-config arp access-list
```

```
show running-config arp access-list arp-acl-name [ permit ip host [ host-ip-address [ mac host [ host-mac-address ] ] ] ]
```

## Parameters

*ip-address*

Specifies the IPv4 address of a static ARP.

**ethernet**

Specifies a physical Ethernet interface.

*slot*

Specifies a valid slot number. Must be 0 if the switch does not contain slots.

*port*

Specifies a valid port number.

**ve** *ve-id*

Specifies a virtual ethernet (VE) interface.

**access-list** *arp-acl-name*

Specifies the name of an ARP ACL defined on the device.

**permit ip host** *host-ip-address*

Specifies rules that permit ARP messages from hosts specified by both IPv4 and MAC addresses.

*host-ip-address*

Specifies the IPv4 address.

**mac host** *host-mac-address*

Specifies the MAC address.

## Modes

Privileged EXEC mode

## Examples

The following example displays a sample run of the **show running-config arp** command.

```
device# arp 12.1.1.2 0000.0000.0001 interface Ethernet 1/72
```

show running-config arp

The following example displays a sample run of the **show running-config arp access-list** option.

```
device# arp access-list acl1
 permit ip host 13.1.1.2 mac host 0000.0000.0002
!
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show running-config dpod

Displays Dynamic Ports on Demand (DPOD) license information.

## Syntax

```
show running-config dpod [ slot/port ]
```

## Command Default

Displays all port reservations on the local switch.

## Parameters

*slot*  
Specifies a valid slot number.

*port*  
Specifies a valid port number.

## Modes

Privileged EXEC mode

## Usage Guidelines

Use this command to display port reservations for a specified port or for all ports on the local switch.

## Examples

To display port reservations for all ports on the local switch:

```
device# show running-config dpod 8/15
dpod 8/15
  reserve
!
switch# show running-config dpod 8/16
dpod 8/16
  reserve
```

To display port reservations on a switch that does not support the DPOD feature:

```
device# show running-config dpod

%No entries found
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# show running-config event-handler

Displays details of one or all event-handler profiles configured on the switch. You can filter the results by description, Python-script action, or trigger ID. You can also display the Python-script action associated with a profile.

## Syntax

```
show running-config event-handler [ event-handler-name ]
show running-config event-handler event-handler-name description
show running-config event-handler event-handler-name action
show running-config event-handler event-handler-name trigger [ trigger-id [ raslog raslog-id [ pattern posix-ext-regex ] ] ]
```

## Parameters

*event-handler-name*

Specifies the name of the event-handler profile. Valid values can have from 1 through 32 characters. The first character must be alphabetic.

**action**

Displays by Python script file-names.

**description**

Describes the event-handler profile. The string can be 1 through 128 characters in length.

**trigger** *trigger-id*

Specifies an event-handler trigger. When the trigger-condition occurs, a Python script is run.

**raslog** *raslog-id*

Specifies a RASlog message ID as the trigger.

**pattern** *posix-ext-regex*

Specifies a POSIX extended regular expression to search for a match within the specified RASlog message ID. For examples, refer to the "trigger" topic.

## Modes

Privileged EXEC mode

## Command Output

The **show running-config event-handler** command displays the following information:

Output field	Description
event-handler	Displays the event-handler name.
action python-script	Displays the name of the Python script called if the event handler is triggered.
trigger	Displays a trigger name and definitions

## Examples

The following example displays the details of all triggers defined for a specified event-handler.

```
device# show running-config event-handler evh1 trigger
event-handler evh1
  trigger 1 raslog NSM-1001
```

The following example displays the details of the action defined for a specified event-handler.

```
device# show running-config event-handler evh1 action
event-handler evh1
  action python-script vlan.py
```

The following example displays the details of all defined event-handlers.

```
device# show running-config event-handler

event-handler evh1
  trigger 10 raslog NSM-1001
  action python-script vlan.py

event-handler evh2
  trigger 100 raslog NSM-1003
  action python-script vlan.py
!
```

## History

Release version	Command history
16r.1.00	This command was introduced.
17r.1.00	This command was modified to support the <b>description</b> parameter.

# show running-config ip access-list

Displays a list of IPv4 ACLs defined on the switch, including the rules they contain.

## Syntax

```
show running-config ip access-list [ { standard | extended } [ ACL_name ] ]
```

## Parameters

### standard

Specifies the standard ACL type.

### extended

Specifies the extended ACL type.

### ACL\_name

Specifies the ACL name.

## Modes

Privileged EXEC mode

## Usage Guidelines

This command is supported only on the local switch.

Not specifying **standard** or **extended** displays a list of all IPv4 ACLs defined on the switch.

If you specify **standard** or **extended**, you can also specify an ACL.

To display details of IPv4 ACLs bound to interfaces, use the **show access-list ip** command.

## Examples

The following example displays the IPv4 ACLs defined on the switch.

```
device# show running-config ip access-list

ip access-list standard stdACL3
  seq 5 permit host 10.20.33.4
  seq 7 permit any
ip access-list extended extdACL5
  seq 5 deny tcp host 10.24.26.145 any eq 23
  seq 7 deny tcp any any eq 80
  seq 10 deny udp any any range 10 25
  seq 15 permit tcp any
ip access-list extended extdACLwithNoRules
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show running-config ipv6

Displays global ipv6 configurations.

## Syntax

```
show running-config ipv6 [ access-list [ extended | standard ] ipv6-acl-name seq sequence-number ]
```

```
show running-config ipv6 [ import routes ]
```

```
show running-config ipv6 [ nd [ global-suppress-ra | ra-dns-server | ra-domain-name ]]
```

```
show running-config ipv6 [ prefix-list [ ge | le ] prefix-length ]
```

```
show running-config ipv6 [ protocol [ vrrp | vrrp-extended ]]
```

```
show running-config ipv6 [ receive access-group ]
```

```
show running-config ipv6 [ route ]
```

```
show running-config ipv6 [ router ospf [ vrf ]]
```

## Parameters

### access-list

Specifies the access-control list (ACL)

### extended

Specifies the extended IP ACL.

### standard

Specifies the standard IP ACL.

### *ipv6-acl-name*

The IPv6 ACL name.

### seq *sequence-number*

Specifies the sequence number.

### import routes

Specifies import IPv6 routes.

### nd

Displays neighbor discovery commands.

### global-suppress-ra

Sets the suppress-ra option globally .

### ra-dns-server

Sets the global DNS server option applied on all ND6.

### ra-domain-name

Set the global domain name option that applied on all ND6 interfaces.

### prefix-list

Specifies the prefix-list.

### ge

Specifies the minimum IPv6 prefix length.

**prefix-length**

The IPv6 prefix length. The range is from 1 through 128.

**le**

Specifies the maximum IPv6 prefix length.

**protocol**

Set the global domain name option that applied on all ND6 interfaces.

**vrrp**

Specifies the Virtual Router Redundancy Protocol IPv6 (VRRPv3).

**vrrp-extended**

Specifies the Virtual Router Redundancy Protocol IPv6 Extended (VRRPv3-E).

**receive**

Specifies the receive ACL.

**access-group**

Specifies to bind or unbind the existing ACL.

**route**

Specifies the IPv6 unicast static route.

**router**

Specifies the IPv6 router.

**ospf**

Specifies the Open Shortest Path First (OSPF) version 3.

**vrf**

Specifies the VRF instance.

## Modes

Privileged EXEC mode

## Examples

The following is an example of the **show running-config ipv6** command output.

```
device# show running-config ipv6
ipv6 route 3063:6363::/64 fe80::52eb:1aff:fe97:cf51 ve 4050
ipv6 nd ra-dns-server 2000:1234:122:ffff::ffee
ipv6 nd ra-dns-server 3500:35:0:35::1
ipv6 nd ra-domain-name extreme.com
ipv6 nd ra-domain-name user.co.in
ipv6 nd ra-domain-name netiron.com
```

## History

Release version	Command history
16.1.00	This command was introduced.



# show running-config ipv6 access-list

Displays a list of IPv6 ACLs defined on the switch, including the rules they contain.

## Syntax

```
show running-config ipv6 access-list [ { standard | extended } [ ACL_name ] ]
```

## Parameters

### standard

Specifies the standard ACL type.

### extended

Specifies the extended ACL type.

### ACL\_name

Specifies the ACL name.

## Modes

Privileged EXEC mode

## Usage Guidelines

This command is supported only on the local switch.

Not specifying **standard** or **extended** displays a list of all IPv6 ACLs defined on the switch.

If you specify **standard** or **extended**, you can also specify an ACL.

To display details of all IPv6 ACLs bound to interfaces, use the **show access-list ipv6** command.

## Examples

The following example displays all standard IPv6 ACLs defined on the switch:

```
device# show running-config ipv6 access-list standard
ipv6 access-list standard distList
  seq 10 deny 2001:125:132:35::/64
  seq 20 deny 2001:54:131::/64
  seq 30 deny 2001:5409:2004::/64
  seq 40 permit any
!
ipv6 access-list standard ipv6_acl_std_1
  seq 10 deny 2001:2001::/64 count log
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show running-config ldap-server

Displays the LDAP server status in the running-config.

## Syntax

```
show running-config ldap-server [ host ipaddr | host-name ]
```

## Parameters

### host

Identifies the IPv4 address of the host.

### *ipaddress*

IPv4 address of the host.

### host-name

Name of the host.

## Modes

Privileged EXEC mode

## Usage Guidelines

LDAP server configuration is placed at the beginning of the running-config and is part of the global configuration of the device. LDAP is enabled by default and no entry is shown in the running-config when set to default.

Attributes with default values will not be displayed.

## Examples

```
device# show running-config ldap-server host 10.24.65.6
ldap-server host 10.24.65.6 use-vrf mgmt-vrf
port 3890 retries 3 timeout 8 basedn security.extreme.com
device#
```

## History

Release version	Command history
16r.1.00	This command was added.

# show running-config mac access-list

Displays a list of MAC ACLs defined on the switch, including the rules they contain.

## Syntax

```
show running-config mac access-list [ { standard | extended } [ ACL_name ] ]
```

## Parameters

### standard

Specifies the standard ACL type.

### extended

Specifies the extended ACL type.

### ACL\_name

Specifies the ACL name.

## Modes

Privileged EXEC mode

## Usage Guidelines

This command is supported only on the local switch.

Not specifying **standard** or **extended** displays a list of all MAC ACLs defined on the switch.

If you specify **standard** or **extended**, you can also specify an ACL.

To display details of all MAC ACLs bound to interfaces, use the **show access-list mac** command.

## Examples

The following example displays all MAC ACLs defined on the switch.

```
device# show running-config mac access-list
mac access-list standard stdmacaclin
seq 11 permit 1111.1112.1113 7777.7777.7777 count log
seq 12 permit 1111.1112.1114 7777.7777.7777 count log
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show running-config password-attributes

Displays global password attributes.

## Syntax

```
show running-config password-attributes [ admin-lockout ] [ max-lockout-duration ] [ max-retry ] [ min-length ]  
show running-config password-attributes character-restriction [ lower | numeric | special-char | upper ]
```

## Parameters

### admin-lockout

Displays lockout for admin role accounts.

### max-retry

Displays the number of failed password logins permitted before a user is locked out. Values range from 0 through 16 attempted logins. The default value is 0.

### min-length

Displays the minimum length of the password. Valid values range from 8 through 32 characters. The default is 8 characters.

### max-lockout-duration

Displays the maximum number of minutes after which the user account is unlocked. Range is from 0 through 99999. The default is 0, representing an infinite duration.

### character-restriction

Displays the restriction on various types of characters.

#### lower

Displays the minimum number of lowercase alphabetic characters that must occur in the password. Values range from 0 through 32 characters. The default value is 0.

#### numeric

Displays the minimum number of numeric characters that must occur in the password. Values range from 0 through 32 characters. The default is 0.

#### special-char

Displays the number of punctuation characters that must occur in the password. All printable, nonalphanumeric punctuation characters, except colon (:) are allowed. Values range from 0 through 32 characters. The default value is 0.

#### upper

Displays the minimum number of uppercase alphabetic characters that must occur in the password. Values range from 0 through 32 characters. The default value is 0.

## Modes

Privileged EXEC mode

## Usage Guidelines

The attributes are not displayed when they hold default values.

## Examples

The following example displays all global password attributes.

```
device# show running-config password-attributes

password-attributes max-retry 4
password-attributes character-restriction upper 1
password-attributes character-restriction lower 2
password-attributes character-restriction numeric 1
password-attributes character-restriction special-char 1
password-attributes max-lockout-duration 5000
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show running-config radius-server

Displays the local device configuration for the RADIUS server from the configuration database.

## Syntax

```
show running-config radius-server host { ip-address | hostname }
```

## Parameters

### host

Identifies the RADIUS server by host name or IP address.

#### *hostname*

Specifies the host name of the RADIUS server.

#### *ip-address*

Specifies the IP address of the RADIUS server. IPv4 and IPv6 are supported.

## Modes

Privileged EXEC mode

## Examples

```
device# show running-config radius-server host 10.38.37.180  
  
radius-server host 10.38.37.180  
protocol    pap  
key         changedsec  
timeout     3
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show running-config rmon

Displays Remote Monitor configuration information.

## Syntax

```
show running-config rmon [ alarm | event ]
```

## Parameters

**alarm**

Displays the Remote Monitor alarm configuration.

**event**

Displays the Remote Monitor event configuration

## Modes

Privileged EXEC mode

# show running-config role

Displays name and description of the configured roles.

## Syntax

```
show running-config role [ name role_name [ desc ] ]
```

## Parameters

- name** *role\_name*  
Displays roles defined for users.
- desc**  
Displays role descriptions.

## Modes

Privileged EXEC mode

## Examples

The following example displays all roles configured on the device.

```
device# show running-config role  
  
role name VLANAdmin desc "Manages security CLIs"  
role name NetworkAdmin desc "Manages Network CLIs"
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# show running-config rule

Displays configured access rules.

## Syntax

```
show running-config rule [ index ]
```

```
show running-config rule index { action | command command_name | operation | role }
```

```
show running-config rule { action { reject | accept } | command command_name | operation { read-only | read-write } | role role-name }
```

## Parameters

*index*

Displays the rule with the specified index number. Values range from 1 through 512.

**action reject | accept**

Following the *index* parameter, indicates whether **reject** or **accept** is specified for that rule. If the *index* parameter is not specified, displays all rules with the specified action.

**command** *command\_name*

Displays rule configuration for the specified command. To display a list of supported commands, type a question mark (?). This list varies according to whether or not you specify a rule index.

**operation read-only | read-write**

Following the *index* parameter, indicates whether **read-only** or **read-write** is specified for that rule. If the *index* parameter is not specified, displays all rules with the specified operation.

**role** *role-name*

Displays rule configuration for the specified role.

## Modes

Privileged EXEC mode

## Examples

The following example displays the configured roles and their rules.

```
device# show running-config rule

rule 30 action accept operation read-write role NetworkSecurityAdmin
rule 30 command role
!
rule 31 action accept operation read-write role NetworkSecurityAdmin
rule 31 command rule
!
rule 32 action accept operation read-write role NetworkSecurityAdmin
rule 32 command username
!
rule 33 action accept operation read-write role NetworkSecurityAdmin
rule 33 command aaa
!
rule 34 action accept operation read-write role NetworkSecurityAdmin
rule 34 command radius-server
!
rule 35 action accept operation read-write role NetworkSecurityAdmin
rule 35 command configure
```

The following example displays a single rule.

```
device# show running-config rule 30

rule 30
  action accept operation read-write role NetworkSecurityAdmin command role
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show running-config ssh

Displays the Secure Shell (SSH) status in the running-config.

## Syntax

```
show running-config ssh
```

## Modes

Privileged EXEC mode

## History

Release version	Command history
16r.1.00	This command was introduced.

# show running-config ssh server

Displays the SSH server status in the running-config.

## Syntax

`show running-config ssh server`

## Modes

Privileged EXEC mode

## Usage Guidelines

SSH server configuration is placed at the beginning of the running-config and is part of the global configuration of the device. SSH is enabled by default and no entry is shown in the running-config when set to default.

## Examples

When SSH service is shut down:

```
device# show running-config ssh server
ssh server shutdown
device# show running-config ssh server
ssh server shutdown
ssh server key-exchange dh-group-14
```

When SSH service is enabled:

## History

Release version	Command history
16r.1.00	This command was introduced.

# show running-config ssh server key-exchange

Displays the SSH server key-exchange status in the running-config.

## Syntax

```
show running-config ssh server key-exchange
```

## Modes

Privileged EXEC mode

## Examples

Typical command output:

```
device# show running-config ssh server key-exchange
ssh server key-exchange dh-group-14
```

When SSH Server Key-exchange is configured to DH Group 14:

```
device# show running-config ssh server key-exchange
ssh server key-exchange dh-group-14
```

When SSH Server Key-exchange method has the default value:

```
device# show running-config ssh server key-exchange
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show running-config username

Displays the user accounts on the device.

## Syntax

```
show running-config username [ username ] [ access-time ] [ desc ] [ enable ] [ encryption-level ] [ expire ] [ password ] [ role ]
```

## Parameters

### *username*

Displays the configuration of a specified username. The maximum number of characters is 40.

### **access-time**

Displays access-time configuration.

### **desc**

Displays the description of the user configuration.

### **enable**

Displays the account enablement status.

### **encryption-level**

Password encryption level. Values are 0 through 7. The default is 0.

### **expire**

Date until the password remains valid in YYYY-MM-DD format. Valid year values range from 1902 through 2037. By default, passwords do not expire.

### **password**

Account password.

### **role**

The role associated with the account.

## Modes

Privileged EXEC mode

## Usage Guidelines

To display details for one user only, specify *username* . Otherwise, this command displays all user accounts on the device.

Use the various parameters to query the specified account details.

This command does not display the root account.

Defaults are not displayed.

## Examples

The following example displays the user accounts on the device.

```
device# show running-config username

username admin password "BwrsDbB+tABWGWpINOVKoQ==\n" encryption-level 7 role admin desc Administrator
username user password "BwrsDbB+tABWGWpINOVKoQ==\n" encryption-level 7 role user desc User
```

The following example displays a specific user account.

```
device# show running-config username admin

username admin password "BwrsDbB+tABWGWpINOVKoQ==\n" encryption-level 7 role admin desc Administrator
```

The following example displays the enabled status for a specific user account.

```
device# show running-config username admin enable

username admin enable true
```

The following example displays user access on the device.

```
device# show running-config username access-time
username admin access-time ""
username extremel access-time 0000
username user access-time ""
username user1 access-time 1700
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show sflow

Displays sFlow configuration information and statistics.

## Syntax

```
show sflow interface | all
```

## Command Default

sFlow is disabled on all interfaces.

## Parameters

**all**

Displays all sFlow information and statistics.

**interface**

Displays sFlow information for an Ethernet interface.

## Modes

Privileged EXEC mode

## Examples

The following example displays all sFlow statistics.

```
device# show sflow all

sFlow services are:                               enabled
Global default sampling rate:                     32768 pkts
Global default counter polling interval:          20 secs
Collector server address
-----
3ffe:1900:4545:3:200:f8ff:fe21:67cf : 6343      0
fe80::200:f8ff:fe21:67cf      : 6343      0
192.35.41.32      : 6343      0
fe80::201:fdff:fe21:43cd      : 6343      0
192.44.23.45      : 6343      0
```



# show slots

Displays the slot information for the SLX-OS device.

## Syntax

**show slots**

## Modes

Privileged EXEC mode

## Command Output

The **show slots** command displays the following information:

Output field	Description
Slot	Slot numbers of the device. <ul style="list-style-type: none"> <li>• M1 and M2—Slots for Management Module (MM)</li> <li>• S1 through S6—Slots for the Switch Fabric Module (SFM)</li> <li>• L1 through L4—Interface module slots for an SLX 9850-4 chassis</li> <li>• L1 through L8—Interface module slots for an SLX 9850-8 chassis</li> </ul>
Type	Module type and version as described in the Description field: <ul style="list-style-type: none"> <li>• MM</li> <li>• SFM</li> <li>• LC36X100G—36-port 100GbE interface module (line card)</li> <li>• LC72X10G—72-port 10GbE interface module (line card)</li> </ul>
Description	Module description.
ID	Module ID: <ul style="list-style-type: none"> <li>• 179—MM</li> <li>• 183—SFM for an SLX 9850-4 router.</li> <li>• 187—SFM for an SLX 9850-8 router.</li> <li>• 180—72-port 10GbE interface module</li> <li>• 181—36-port 100GbE interface module</li> </ul>
Status	Status of the module as one of the following: <ul style="list-style-type: none"> <li>• DIAG RUNNING POST1—The module is present, powered on, and running the POST (power-on self-test). This status is not valid for the management modules.</li> <li>• DIAG RUNNING POST2—The module is present, powered on, and running the reboot power on self tests. This status is not valid for the management modules.</li> <li>• DISABLED—The module is powered on but disabled.</li> <li>• ENABLED—The module is on and fully enabled.</li> <li>• FAULTY—The module is faulty because an error is detected.</li> <li>• INITIALIZING—The module is present, powered on, and initializing hardware components.</li> <li>• LOADING—The module is present, powered on, and loading the initial configuration.</li> <li>• POWERED-OFF—The module is present in the slot but is powered off.</li> <li>• POWERING UP—The module is present and powering on.</li> </ul>

Output field	Description
	<ul style="list-style-type: none"> <li>UNKNOWN—The module is inserted but its state cannot be determined.</li> <li>UNLATCHED—The module is inserted but it is not secured to the chassis with its captive screws. This status is supported for SFMs, 72-port 10GbE module (Version 6 and above), and the 36-port 100GbE module (Version 4 and above).</li> <li>VACANT—The slot is empty.</li> </ul>

## Examples

The following example shows the slot information for an SLX 9850-4 router.

```

device# show slots
Slot  Type           Description                ID      Status
-----
M1    MM v1             Management Module         179    ENABLED
M2    MM v3             Management Module         179    ENABLED
S1    SFM8 v6           Switch Fabric Module      187    UNLATCHED
S2    SFM8 v6           Switch Fabric Module      187    ENABLED
S3    SFM8 v6           Switch Fabric Module      187    ENABLED
S4    SFM8 v6           Switch Fabric Module      187    ENABLED
S5
S6
L1
L2
L3
L4
L5    LC72X10G v8       72-port 10GE card        180    UNLATCHED
L6
L7
L8    LC36x100G v3      36-port 100GE card       181    ENABLED

```

## History

Release version	Command history
16r.1.00	This command was introduced for SFMs.
16r.1.01	This command was modified to add line cards and add the UNLATCHED status for SFMs.
17r.1.01	The documentation was modified to include information about the versions of line cards that support latch detection.

# show span path session

Displays the SPAN path information.

## Syntax

```
show span path session session-number
```

## Parameters

*session-number*

Specifies the SPAN session.

## Modes

Privileged EXEC mode

## Examples

The following example displays the SPAN path information.

```
device# show span path session 1
```

```
Session                :1
Path                   :Eth 0/10 -> Eth 0/1 (ISL-exit port) -> Eth 0/16
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show spanning-tree

Displays Spanning Tree Protocol (STP) information.

## Syntax

```
show spanning-tree [ brief | interface { ethernet slot/port | port-channel port_channel_number } | pvst | mst [ brief | detail | instance instance_id | interface ] mst-config | vlan vlan_id ]
```

## Parameters

### brief

Display brief spanning tree information.

### interface

Display information about the spanning tree configuration on an interface.

### ethernet *slot/port*

Display spanning tree information about a specific Ethernet interface.

### port-channel *port\_channel\_number*

Display spanning tree information about a port channel interface.

### pvst

Display PVST+ information.

### mst

Display MSTP information.

### detail

Display detailed MSTP tree information.

### instance *instance\_id*

Display MSTP information about a specific instance.

### mst-config

Display MSTP region configuration information.

### vlan *vlan\_id*

Display spanning tree information about a specific VLAN.

## Modes

Privileged EXEC mode.

## Usage Guidelines

### NOTE

Extreme Networks supports the PVST+ and R-PVST+ protocols. The PVST and R-PVST protocols are proprietary to Cisco and are not supported.

## Examples

To display spanning tree information:

```
device# show spanning-tree brief
```

```
Spanning-tree Mode: Spanning Tree Protocol
```

```
Root ID      Priority 4096
             Address 768e.f805.5800
             Hello Time 8, Max Age 25, Forward Delay 20
```

```
Bridge ID    Priority 4096
             Address 768e.f805.5800
             Hello Time 8, Max Age 25, Forward Delay 20
```

Interface	Role	Sts	Cost	Prio	Link-type	Edge
Eth 2/32	DES	FWD	2000	128	P2P	No
Eth 2/66	DES	FWD	2000	128	P2P	No
Po 7	DES	FWD	2000	128	P2P	No
Po 8	DES	FWD	2000	128	P2P	No
Po 21	DES	LIS	500	128	P2P	No
Po 141	BKUP	BLK	1000	128	P2P	No
Po 151	DES	FWD	10000	128	P2P	No
Po 154	DES	FWD	285	128	P2P	No
Po 172	BKUP	BLK	1000	128	P2P	No
Po 173	BKUP	BLK	500	128	P2P	No

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ssh client status

Displays the current Secure Shell (SSH) client key-exchange status.

## Syntax

`show ssh client status`

## Modes

Privileged EXEC mode

## Examples

When SSH server is enabled:

```
device# show ssh client status
SSH client status: Enabled
device#
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show ssh server status

Displays the current Secure Shell (SSH) server key-exchange status.

## Syntax

```
show ssh server status
```

## Modes

Privileged EXEC mode

## Examples

When SSH server is enabled:

```
device# show ssh server status
SSH server status: Enabled
device#
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show startup-config

Displays the contents of the startup configuration.

## Syntax

`show startup-config`

## Modes

Privileged EXEC mode

## Usage Guidelines

This command is supported only on the local device.

## Examples

The following example displays the contents of the startup configuration file.

```
device# show startup-config
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# show startup-database

Displays the startup database information.

## Syntax

```
show startup-database
```

## Modes

Privileged EXEC mode

## Usage Guidelines

Enter **show startup-database ?** to display the list of available database entries.

## Examples

To display the logging configuration in the startup database:

```
device# show startup-db logging
logging raslog console INFO
logging auditlog class SECURITY
logging auditlog class CONFIGURATION
logging auditlog class FIRMWARE
logging syslog-facility local LOG_LOCAL7
logging syslog-client localip CHASSIS_IP
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show statistics access-list

For a given network protocol and inbound/outbound direction, displays ACL statistical information. You can show statistics for a specified ACL or only for that ACL on a specified interface. You can also display statistical information for all ACLs bound to a specified device interface, VLAN or VE. You can also display statistical information for IPv4 or IPv6 receive-path ACLs.

## Syntax

```
show statistics access-list interface { ethernet slot / port | port-channel index | ve vlan_id | vlan vlan_id } { in | out }
show statistics access-list { ip | ipv6 } name interface [ ethernet slot / port | port-channel index | ve vlan_id ] { in | out }
show statistics access-list mac name interface [ ethernet slot / port | port-channel index | vlan vlan_id ] { in | out }
show statistics access-list receive { ip | ipv6 }
```

## Parameters

### interface

Filter by interface.

### ethernet

Specifies a physical Ethernet interface.

### slot

Specifies a valid slot number.

### port

Specifies a valid port number.

### port-channel index

Specifies a port-channel interface.

### ve vlan\_id

Specifies a virtual Ethernet (VE) interface.

### vlan vlan\_id

Specifies a VLAN interface.

### in | out

Specifies the ACL binding direction (incoming or outgoing).

### ip | ipv6 | mac

Specifies the network protocol.

### name

Specifies the ACL name.

### receive

Specifies IPv4 or IPv6 receive-path traffic.

## Modes

Privileged EXEC mode

## Usage Guidelines

Statistics are displayed only for rules that contain the **count** keyword.

## Command Output

The **show statistics access-list** command displays the following information:

Output field	Description
Unaccountable	The counter resource is not allocated. This is typically seen if counting is not supported or if the hardware resources limit is reached.
Unwritten	The rule is inactive and is not programmed in the hardware. This is typically seen when the hardware resources limit is reached.

## Examples

The following example displays inbound ACL statistics for a named IPv4 ACL.

```
device# show statistics access-list ip l3ext in
ip access-list l3ext Ethernet 1/8 in
seq 76 deny ip 10.10.75.10 0.0.0.0 any count log (795239 frames)
seq 77 hard-drop ip 10.10.75.10 0.0.0.0 10.10.11.0 0.0.0.255 count log (0 frames)
seq 78 hard-drop ip any 10.10.11.0 0.0.0.255 count log (0 frames)
seq 79 hard-drop ip any 10.10.0.0 0.0.255.255 count log (0 frames)
seq 80 hard-drop ip 10.10.75.10 0.0.0.0 any count log (0 frames)
seq 81 hard-drop ip 10.10.75.0 0.0.0.0 10.10.0.0 0.0.255.255 count log (0 frames)
seq 91 hard-drop ip any any count (0 frames)
seq 100 deny udp 10.10.75.0 0.0.0.255 10.10.76.0 0.0.0.255 count log (0 frames)
seq 1000 permit ip any any count log (0 frames)
```

The following example displays inbound ACL statistics for a specified interface. The ACL named `ipv6-std-acl` is applied on interface `4/1` to filter incoming routed traffic only.

```
device# show statistics access-list interface ethernet 4/1 in
ipv6 routed access-list ipv6-std-acl on Ethernet 4/1 at Ingress (From User)
  seq 10 permit host 0:1::1
  seq 20 deny 0:2::/64
  seq 30 deny any count (100 frames)
```

The following example displays inbound statistics for all ACLs bound to a specified VE interface.

```
device# show statistics access-list interface ve 3010 in
ipv6 access-list ip_acl_3 on Ve 3010 at Ingress (From User)
  seq 10 deny ipv6 2001:3010:131:35::/64 2001:1001:1234:1::/64 count (0 frames)
  seq 20 permit ipv6 2001:3010:131:35::/64 2001:3001:1234:1::/64
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show statistics access-list overlay type vxlan

Displays the statistics for each of the filter if filter has statistics enabled.

## Syntax

```
show statistics access-list overlay type vxlan user-acl-name
```

## Parameters

*user-acl-name*

The access list name.

## Modes

Privileged EXEC mode

## Examples

```
device# show statistics access-list overlay type vxlan abc_ext
Number of Rules: 2
seq 1000 permit dst-vtep-ip-host 200.1.1.1 src-vtep-ip-host 150.1.1.1 vni 1 vni-mask 0 redirect
Ethernet 2/65 sflow count 0(pkts)/0(bytes)
seq 1010 permit dst-vtep-ip-host 200.1.1.2 src-vtep-ip-host 150.1.1.2 vni 2 vni-mask 0 redirect
Ethernet 2/19 sflow count 44024773(pkts)/52829727600(bytes)
```

```
device# show access-list overlay transit tr_name
Overlay Transit Global Binding
  Inbound access-list is abc_ext (From User)
  Outbound access-list is not set
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show statistics bridge-domain

Displays statistics for logical interfaces in bridge domains.

## Syntax

```
show statistics bridge-domain bd-id
```

## Parameters

*bd-id*

The bridge domain ID.

## Modes

Privileged EXEC mode

## Usage Guidelines

```
show statistics bridge-domain bd- id
```

## Command Output

The **show statistics bridge-domain** command displays the following information:

Field	Description
Interface	The interface whose counter statistics are displayed.
RxPkts	The number of packets received at the specified interface.
RxBytes	The number of bytes received at the specified interface.
TxPkts	The number of packets transmitted from the specified interface.
TxBytes	The number of bytes transmitted from the specified interface.

## Examples

The following example displays statistics for all logical interfaces in all bridge domains.

```
device# show statistics bridge-domain
```

```
Bridge Domain 1 Statistics
```

Interface	RxPkts	RxBytes	TxPkts	TxBytes
eth 1/1.100	821729	821729	95940360	95940360
eth 1/21.200	884484	885855	95969584	95484555
po 1.300	8884	8855	9684	9955

```
Bridge Domain 20 Statistics
```

Interface	RxPkts	RxBytes	TxPkts	TxBytes
eth 1/6.400	821729	821729	95940360	95940360
eth 1/21.100	8884	8855	9684	9955
po 2.40	884484	885855	95969584	95484555

show statistics bridge-domain

The following example displays statistics for all logical interfaces in the bridge domain 1.

```
device# show statistics bridge-domain 1
```

```
Bridge Domain 1 Statistics
Interface          RxPkts      RxBytes      TxPkts      TxBytes
eth 1/1.100        821729      821729       95940360    95940360
eth 1/21.200       884484      885855       95969584    95484555
po 1.300           8884        8855         9684        9955
```

## History

Release version	Command history
16r.1.01	This command was introduced.

# show statistics vlan

Displays the statistics for all ports and port channels on configured VLANs.

## Syntax

```
show statistics vlan vlan id
```

## Parameters

*vlan ID*

The specific VLAN ID.

## Modes

Privileged EXEC mode

## Usage Guidelines

```
show statistics vlan vlan- id
```

## Command Output

The **show statistics vlan** command displays the following information:

Field	Description
Interface	The interface whose counter statistics are displayed.
RxPkts	The number of packets received at the specified port.
RxBytes	The number of bytes received at the specified port.
TxPkts	The number of packets transmitted from the specified port.
TxBytes	The number of bytes transmitted from the specified port.

## Examples

The following example displays statistics for all ports and port channels on configured VLANs.

```
device# show statistics vlan
```

```
Vlan 10 Statistics
Interface      RxPkts          RxBytes          TxPkts          TxBytes
eth 1/1        821729          821729          95940360        95940360
eth 1/2        884484          885855          95969584        95484555
po 1           8884            8855            9684             9955

Vlan 20 Statistics
Interface      RxPkts          RxBytes          TxPkts          TxBytes
eth 1/6        821729          821729          95940360        95940360
eth 1/21       8884            8855            9684             9955
po 2           884484          885855          95969584        95484555
```

show statistics vlan

The following example displays statistics for all ports and port channels in the VLAN 10.

```
device# show statistics vlan 10
```

```
Vlan 10 Statistics
Interface      RxPkts      RxBytes      TxPkts      TxBytes
eth 1/1        821729      821729      95940360    95940360
eth 1/2        884484      885855      95969584    95484555
po 1           8884        8855        9684        9955
```

## History

Release version	Command history
16r.1.01	This command was introduced.



# show statistics vpn

Displays the VPN statistics for a VRF.

## Syntax

```
show statistics vpn vrf vrf-id
```

## Modes

Privileged EXEC mode

## Command Output

The **show statistics vpn** command displays the following information:

Output field	Description
Tnl In-Pkt	Displays in packets.
Tnl Out-Pkt	Displays out packets.

## Examples

This example displays the VPN statistic for a VRF.

```
device# show statistics vpn
Output:
VRF Name          Tnl In-Pkt      Tnl Out-Pkt
red                0                0
```

## History

Release version	Command history
17r.1.01	This command was introduced.

# show storm-control

Displays all BUM (broadcast, unknown unicast and multicast)-related configurations in the system.

## Syntax

**show storm-control**

**show storm-control** [ **broadcast** | **multicast** | **unknown-unicast** ] [ **interface** { **ethernet** } *slot/port* ]

## Parameters

**storm-control**

Displays all BUM-related configurations in the system.

**broadcast**

Displays all BUM-related configurations in the system for the broadcast traffic type.

**interface**

Displays all BUM-related configurations in the system for the specified interface.

**ethernet**

Represents a valid, physical Ethernet port.

*slot/port*

Specifies a valid slot and port number.

**multicast**

Displays all BUM-related configurations in the system for the multicast traffic type.

**unknown-unicast**

Displays all BUM-related configurations in the system for the unknown-unicast traffic type.

## Modes

Privileged EXEC mode

## Usage Guidelines

Use this command to display BUM storm-control-related configuration for the entire system, for specified traffic types, for specified interfaces, or for specified traffic types on specified interface.

## Examples

To display storm control information for broadcast traffic on an Ethernet interface:

```
device# show storm-control broadcast interface ethernet 2/1

Interface  Type          rate (Mbps)  conformed   violated    total
Et 2/1    broadcast     100,000     12500000000 12500000000 25000000000
```

To display storm control information for all traffic on an Ethernet interface.

```
device# show storm-control interface ethernet 2/1

Interface  Type          rate (Mbps)  conformed   violated    total
Et 2/1    broadcast     100,000     12500000000 12500000000 25000000000
Et 2/1    unknown-unicast 100,000     12500000000 12500000000 25000000000
Et 2/1    multicast     100,000     12500000000 12500000000 25000000000
```

To display storm control information for all traffic in the system:

```
device# show storm-control

Interface  Type          rate (Mbps)  conformed   violated    total
Et 2/1    broadcast     100,000     12500000000 12500000000 25000000000
Et 2/1    unknown-unicast 100,000     12500000000 12500000000 25000000000
Et 2/1    multicast     100,000     12500000000 12500000000 25000000000
Et 2/2    broadcast     100,000     12500000000 12500000000 25000000000
Et 2/3    broadcast     100,000     12500000000 12500000000 25000000000
Et 2/4    unknown-unicast 100,000     12500000000 12500000000 25000000000
```

To display storm control information for all broadcast traffic the system:

```
device# show storm-control broadcast

Interface  Type          rate (Mbps)  conformed   violated    total
Et 2/1    broadcast     100,000     12500000000 12500000000 25000000000
Et 2/2    broadcast     100,000     12500000000 12500000000 25000000000
Et 2/3    broadcast     100,000     12500000000 12500000000 25000000000
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show support

Displays a list of core files on the device.

## Syntax

`show support`

## Command Default

Displays information for the local device.

## Modes

Privileged EXEC mode

## Usage Guidelines

This command is supported only on the local device.

Pagination is not supported with this command. Use the **More** option to display the output one page at a time.

## Examples

To display the core files:

```
device# show support
No core or FFDC data files found!
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show system monitor tm

Displays the system monitoring configuration for the Traffic Manager (TM) device deleted or discarded packets, or Virtual Output Queue (VOQ) discarded packets.

## Syntax

`show system monitor tm delete-packets | discard-packets | discard-voq-packets`

## Parameters

### delete-packets

Displays the monitoring configuration of the TM device deleted packets.

### discard-packets

Displays the monitoring configuration of the TM device discarded packets.

### discard-voq-packets

Displays the monitoring configuration of the VOQ discarded packets.

## Modes

Privileged EXEC

## Command Output

The `show system monitor tm` command displays the following information:

Output field	Description
Logging-interval	Logging interval in minutes in which a RASlog message is generated.
Threshold	Threshold number of deleted or discarded packets. When the threshold is exceeded, a RASlog message is generated.

## Examples

The following example displays the monitoring configuration of the VOQ discarded packets.

```
device# show system monitor tm discard-voq-packet
Discard VOQ packet count monitoring configuration:
Logging-interval : 60 minutes
Threshold       : 10 packets
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# show telnet server status

Displays the current Telnet server status.

## Syntax

`show telnet server status`

## Modes

Privileged EXEC mode

## Examples

To display Telnet server status:

```
device# show telnet server status
VRF-Name: mgmt-vrf      Status: Enabled
VRF-Name: default-vrf  Status: Enabled
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show threshold monitor

Displays the current status of environmental thresholds and alerts for interfaces, security, and SFPs.

## Syntax

```
show threshold monitor [ interface all area | security area [ login-violation | telnet-violation ] | sfp all area [ current | rxp |  
temperature | txp | voltage ]
```

## Parameters

### interface all area

Displays status of interface thresholds and alerts.

### security area

Displays status of security thresholds and alerts.

### login-violation

Displays status of login violations.

### telnet-violation

Displays status of Telnet violations.

### sfp all area

Displays status of SFP thresholds and alerts.

### current

Amount of current supplied to the SFP transceiver.

### rxp

Amount of incoming laser power, in microWatts ( $\mu$ W).

### temperature

Temperature of the SFP, in degrees Celsius.

### txp

Amount of outgoing laser power, in microWatts ( $\mu$ W).

### voltage

Amount of voltage supplied to the SFP.

## Modes

Privileged EXEC mode

show threshold monitor

## Examples

```
device# show threshold monitor sfp all area temperature
Interface                               Type      Area      Value      Status
Monitoring Status
-----
Eth 0/3                                 10GSR    Temperature  26 Centigrade  In Range
Monitoring
Eth 0/4                                 10GSR    Temperature  24 Centigrade  In Range
Monitoring
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# show tm voq-stat ingress-device all discards

Displays a summary of the traffic management VOQ discard count for all towers.

## Syntax

```
show tm voq-stat ingress-device all discards [ priority traffic_class ] [ max-display max_display_number ]
```

## Parameters

**priority** *traffic\_class*

Displays discards for the specified traffic class priority. Enter an integer from 0 through 7.

**max-display** *max\_display\_number*

Displays the specified maximum number of discard entries. Enter an integer from 1 through 32.

## Modes

Privileged EXEC mode.

## Usage Guidelines

The entries are sorted by the highest number of discards.

If you do not enter the **max-display** *max\_display\_number* option, a maximum of eight entries is displayed.

## Examples

The following example displays the traffic management VOQ ingress discard statistics.

```
device# show tm voq-stat ingress-device all discards
```

```
-----SLOT 3 TOWER 2-----
Dest Port | Prio | Queue | Discards
-----
3/1       | 0    | 320   | 2473804
2/4       | 0    | 224   | 1867789
4/2       | 2    | 434   | 1023452
4/8       | 4    | 487   | 920349
1/2       | 1    | 120   | 858723
1/3       | 1    | 128   | 75328
2/5       | 0    | 260   | 22234
2/6       | 0    | 268   | 5248
```

The following example displays the traffic management VOQ ingress discard statistics for a specific traffic class priority.

```
device# show tm voq-stat ingress-device all discards priority 0
```

```
-----SLOT 3 TOWER 2-----
Dest Port | Prio | Queue | Discards
-----
3/1       | 0    | 320   | 2473804
2/4       | 0    | 224   | 1867789
2/5       | 0    | 260   | 22234
2/6       | 0    | 268   | 5248
```

show tm voq-stat ingress-device all discards

## History

Release version	Command history
16r.1.00	This command was introduced.

# show tm voq-stat ingress-device all egress-port ethernet

Displays traffic management Virtual output queue (VOQ) statistics for all towers of an egress Ethernet interface.

## Syntax

```
show tm voq-stat ingress-device all egress-port ethernet slot/port [ priority number ]
```

## Parameters

*slot/port*

Specifies the slot and port of the interface.

*priority number*

Optionally specifies the traffic-class priority of the VOQ statistics. Enter an integer from 0 through 7. If you do not include this option, all priorities are displayed.

## Modes

Privileged EXEC

## Usage Guidelines

## Command Output

The **show tm voq-stat ingress-device all egress-port ethernet** command displays the following information:

Output field	Description
Priority	Traffic-class priority number of the VOQ statistics.
EnQue Pkt Count	The count of all packets entering ingress queues on this traffic manager.
EnQue Bytes Count	The count of all bytes entering ingress queues on this traffic manager.
Total Discard Pkt Count	The count of all packets failing to enter ingress queues on this traffic manager.
Total Discard Bytes Count	The count of all bytes failing to enter ingress queues on this traffic manager.
Current Queue Depth	The current queue depth.
Maximum Queue Depth since Last read	The maximum queue depth since last access to read.

```
show tm voq-stat ingress-device all egress-port ethernet
```

## Examples

The following example displays the VOQ statistics for traffic-class priority 0 on Ethernet interface 1/4.

```
show tm voq-stat ingress-device all egress-port ethernet 1/4 priority 0
```

```
VOQ-Counters:
```

```
=====
```

```
Priority 0
```

```
-----
```

```
EnQue Pkt Count          0
EnQue Bytes Count        0
Total Discard Pkt Count  0
Total Discard Bytes Count 0
Current Queue Depth      0
Maximum Queue Depth since Last read 0
```

## History

Release version	Command history
16r.1.01	This command was introduced.

# show tm voq-stat ingress-device all max-buffer-util

Displays the traffic management VOQ maximum buffer size and utilization statistics for all towers.

## Syntax

```
show tm voq-stat ingress-device all max-buffer-util
```

## Modes

Privileged EXEC mode.

## Examples

The following example displays the VOQ maximum buffer utilization statistics.

```
device# show tm voq-stat ingress-device all max-buffer-util

----- Slot 1 Tower 1 -----
  Max Buffer Size | Max Buffer Util
-----
          6007013804 |          96%
.....
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show tm voq-stat ingress-device all max-queue-depth

Displays the traffic management VOQ max-queue-depth statistics for all towers.

## Syntax

```
show tm voq-stat ingress-device all max-queue-depth [ max-display max_display_number ] [ min-threshold filter_number ]
[ priority traffic_class ]
```

## Parameters

**max-display** *max\_display\_number*

Specifies the maximum displayed entries. Enter an integer from 1 to 32.

**min-threshold** *filter\_number*

Ignores the maximum queue depths below the specified min-threshold filter in bytes. Enter an integer from 1 through 1048640.

**priority** *traffic\_class*

Displays only the specified traffic-class priority. Enter an integer from 0 through 7.

## Modes

Privileged EXEC mode.

## Usage Guidelines

The entries are sorted by the highest number of discards.

If you do not enter the **max-display** *max\_display\_number* option, a maximum of eight entries is displayed.

## Examples

The following example displays the traffic management VOQ maximum queue depth statistics.

```
device# # show tm voq-stat ingress-device all max-queue-depth
```

```
----- Slot 1 Tower 1 -----
Dest Port | Prio | Queue | Max Depth | Max Util
-----|-----|-----|-----|-----
3/1       | 0    | 320   | 1013804  | 96%
2/4       | 0    | 224   | 902789   | 86%
4/2       | 2    | 434   | 543440   | 51%
4/8       | 4    | 487   | 220349   | 21%
1/2       | 1    | 120   | 138723   | 13%
1/3       | 1    | 128   | 97328    | 9%
2/5       | 0    | 260   | 34234    | 3%
2/6       | 0    | 268   | 11723    | 1%
```

....

## History

Release version	Command history
16r.1.00	This command was introduced.

# show tm voq-stat ingress-device ethernet

Displays traffic management VOQ statistics for a specific ingress Ethernet interface.

## Syntax

```
show tm voq-stat ingress-device ethernet slot/port { discards [ max-display max_display_number | priority traffic_class ] |  
egress-port ethernet slot/port [ priority traffic_class ] | max-buffer-util | max-queue-depth [ max-display  
max_display_number | min-threshold minimum_threshold [ max-display max_display_number | priority traffic_class ] |  
priority traffic_class ] }
```

## Parameters

*slot/port*

The Ethernet slot and port

**discards**

Specifies discarded

**max-display**

Limits the display of discards.

*max\_display\_number*

The discard display limit. The values range from one to a maximum of 32.

**priority**

Displays discards by their traffic class priority.

*traffic\_class*

Traffic class priorities range from 0 through 7.

**egress-port** *slot/port*

The outbound port.

**max-buffer-util**

Displays a summary of traffic management VOQ maximum buffer utilization.

**max-queue-depth**

Displays a summary of traffic management VOQ maximum queue depth statistics.

**max-display**

Limit the output to a maximum number of display entries

*max\_display\_number*

The output that the display is limited to. The range is from 1 to 64 entries.

**min-threshold**

Specifies that the results leave out **max-queue-depths** below the minimum Byte threshold.

*minimum\_threshold*

The minimum threshold filter value in bytes. The range is from 1 to 1048640.

## Modes

Privileged EXEC mode.



## Examples

Follow this example to display traffic management VOQ statistics for an egress interface.

```
device# show tm voq-stat ingress-device ethernet 2/1 egress-port ethernet 2/7 priority 2
```

```
VOQ-Counters:
```

```
=====
Priority 2
-----
EnQue Pkt Count          67404602
EnQue Bytes Count       1768413221
Total Discard Pkt Count      0
Total Discard Bytes Count    0
Current Queue Depth         0
Maximum Queue Depth since Last read 160
```

Follow this example to display a summary of traffic management VOQ maximum queue depth statistics for a specific ingress interface.

```
device# show tm voq-stat ingress-device 2/1 max-queue-depth
```

```
----- Ports 1/1 - 1/36 -----
Dest Port | Prio | Queue | Max Depth | Max Util
-----|-----|-----|-----|-----
3/1       | 0    | 320   | 1013804   | 96%
2/4       | 0    | 224   | 902789    | 86%
4/2       | 2    | 434   | 543440    | 51%
4/8       | 4    | 487   | 220349    | 21%
1/2       | 1    | 120   | 138723    | 13%
1/3       | 1    | 128   | 97328     | 9%
2/5       | 0    | 260   | 34234     | 3%
2/6       | 0    | 268   | 11723     | 1%
```

Follow this example to display a summary of traffic management VOQ maximum buffer utilization for a specific ingress interface.

```
device# show tm voq-stat ingress-device 2/1 max-buffer-util
```

```
----- Ports 1/1 - 1/36 -----
Max Buffer Size | Max Buffer Util
-----|-----
6007013804 | 96%
```

Follow this example to display a summary of traffic management VOQ discards for a specific ingress interface.

```
device# show tm voq-stat ingress-device 2/1 discards
```

```
----- Ports 1/1 - 1/36 -----
Dest Port | Prio | Queue | Discards
-----|-----|-----|-----
3/1       | 0    | 320   | 2473804
2/4       | 0    | 224   | 1867789
4/2       | 2    | 434   | 1023452
4/8       | 4    | 487   | 920349
1/2       | 1    | 120   | 858723
1/3       | 1    | 128   | 75328
2/5       | 0    | 260   | 22234
2/6       | 0    | 268   | 5248
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show tm voq-stat slot

Displays the traffic management VOQ statistics for a line card (LC) in a named slot.

## Syntax

```
show tm voq-stat slot slot_number [ cpu-group [ cpu_group_id | all ]
```

## Parameters

*slot\_number*

The LC slot.

**cpu-group** *cpu\_group\_id*

The ID number for the CPU group.

## Modes

Privileged EXEC mode.

## Examples

To display information about the VOQ for the LC in slot 1 CPU group 1 use the following command.

```
device# show tm voq-stat slot 1 cpu-group 1
CPU Group 1 Prio 0
  EnQue Pkt Count          100
  EnQue Bytes Count       22400
  Total Discard Pkt Count    0
  Total Discard Bytes Count  0
  Current Queue Depth      0
  Maximum Queue Depth since last read 0

CPU Group 1 Prio 1
  EnQue Pkt Count          100
  EnQue Bytes Count       22400
  Total Discard Pkt Count    0
  Total Discard Bytes Count  0
  Current Queue Depth      0
  Maximum Queue Depth since last read 0

CPU Group 1 Prio 2
  EnQue Pkt Count          100
  EnQue Bytes Count       22400
  Total Discard Pkt Count    0
  Total Discard Bytes Count  0
  Current Queue Depth      0
  Maximum Queue Depth since last read 0

CPU Group 1 Prio 3
  EnQue Pkt Count          100
  EnQue Bytes Count       22400
  Total Discard Pkt Count    0
  Total Discard Bytes Count  0
  Current Queue Depth      0
  Maximum Queue Depth since last read 0

CPU Group 1 Prio 4
  EnQue Pkt Count          100
  EnQue Bytes Count       22400
  Total Discard Pkt Count    0
  Total Discard Bytes Count  0
  Current Queue Depth      0
  Maximum Queue Depth since last read 0

CPU Group 1 Prio 5
  EnQue Pkt Count          100
  EnQue Bytes Count       22400
  Total Discard Pkt Count    0
  Total Discard Bytes Count  0
  Current Queue Depth      0
  Maximum Queue Depth since last read 0

CPU Group 1 Prio 6
  EnQue Pkt Count          100
  EnQue Bytes Count       22400
  Total Discard Pkt Count    0
  Total Discard Bytes Count  0
  Current Queue Depth      0
  Maximum Queue Depth since last read 0

CPU Group 1 Prio 7
  EnQue Pkt Count          100
  EnQue Bytes Count       22400
  Total Discard Pkt Count    0
  Total Discard Bytes Count  0
  Current Queue Depth      0
  Maximum Queue Depth since last read 0
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show topology-group

Displays topology group information.

## Syntax

```
show topology-group [ group-id ]
```

## Parameters

*group-id*

Displays the information of the topology group of the specified ID.

## Modes

User EXEC mode

Privileged EXEC mode

Global configuration mode

Interface configuration mode

VLAN configuration mode

## Usage Guidelines

## Command Output

The **show topology-group** command displays the following information:

Output field	Description
master-vlan	The master VLAN for the topology group. The settings for STP, MRP, or VSRP on the control ports in the master VLAN apply to all control ports in the member VLANs within the topology group.
member-vlan	The member VLANs in the topology group.
Common control ports	The master VLAN ports that are configured with Layer 2 protocol information. The Layer 2 protocol configuration and state of these ports in the master VLAN applies to the same port numbers in all the member VLANs.
Per vlan free ports	The ports that are not controlled by the Layer 2 protocol information in the master VLAN.

## Examples

The following example displays the topology group information.

```
device# show topology-group
Topology Group 3
=====
master-vlan 2
member-vlan none
Common control ports      L2 protocol
ethernet 1/1/1            MRP
ethernet 1/1/2            MRP
ethernet 1/1/5            VSRP
ethernet 1/2/22           VSRP
Per vlan free ports
ethernet 1/2/3            Vlan 2
ethernet 1/1/4            Vlan 2
ethernet 1/2/11           Vlan 2
ethernet 1/2/12           Vlan 2
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show tunnel

Displays information pertaining to a tunnel interface.

## Syntax

```
show tunnel tunnel-id
```

## Parameters

*tunnel-id*

Specifies the tunnel ID.

## Modes

Privileged EXEC Mode

## Examples

This example displays tunnel information.

```
device# show tunnel 10
Tunnel 10, mode GRE
Ifindex 0x7c40000a, Admin state up, Oper state up
Source IP 14.101.0.4, Vrf default-vrf
Destination IP 15.10.0.3
Tunnel IP Interface : Ve 501 up
Tunnel TTL 255      Tunnel DSCP 0
Tunnel QosMode PIPE
Keepalive Interval 10000  RetryCount 3 TimeRemaining 27861 msecs
GRE Keep Alive : RX 62      TX 62

Active next hops:
IP: 13.10.0.3, Vrf: default-vrf
Egress L3 port: Ve 10, Outer SMAC: 609c.9f0d.4a14
Outer DMAC: 001b.ed9f.1700
Egress L2 Port: Unknown, Outer ctag: 0, stag:0, Egress mode: Local
BUM forwarder: no
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show tunnel statistics

Displays tunnel statistics.

## Syntax

```
show tunnel statistics tunnel-id mode [ gre ]
```

## Parameters

*tunnel-id*

Filters by the tunnel ID.

**mode**

Filters by tunnel mode.

**gre**

Specifies GRE tunnels.

## Modes

Privileged EXEC Mode

## Examples

This example displays tunnel statistics filtered by the tunnel ID.

```
device# show tunnel statistics 11
Tnl ID   RX packets   TX packets   RX bytes   TX bytes
=====
11       0             10           (NA)      640
```

This example displays tunnel statistics filtered by tunnel mode.

```
device# show tunnel statistics mode gre
Tnl ID   RX packets   TX packets   RX bytes   TX bytes
=====
10       0             10           (NA)      640
11       0             20           (NA)     1280
12       0             50           (NA)    22000
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# show uddl

Shows global UDLD information.

## Syntax

```
show uddl
```

## Modes

Privileged EXEC mode

## Usage Guidelines

This command displays global unidirectional link detection (UDLD) protocol configuration values such as whether the protocol is enabled on the switch and the *hello* time and timeout values.

## Examples

The following example displays global UDLD information for the device.

```
device# show uddl
UDLD Global Information
  Admin State:      UDLD enabled
  UDLD hello time:  500 milliseconds
  UDLD timeout:    2500 milliseconds
```

# show udd interface

Display unidirectional link detection (UDLD) protocol information for the specified interface.

## Syntax

```
show udd interface [ ethernet slot/port ]
```

## Parameters

### ethernet

Represents a valid, physical Ethernet type for all available Ethernet speeds.

### slot/port

Specifies a valid slot and port number.

## Modes

Privileged EXEC mode.

## Usage Guidelines

The following describes the values that appear in the output headings for this command.

**TABLE 6** Description UDLD headings

Heading	Description
State	Describes if UDLD is enable or disabled.
Mode	Describes if the mode is Receive, Transmit, or Both (Transmit/Receive).
Advertise Transmitted	Describes how often the advertisement is transmitted.
Hold time for advertise	Describes the hold time for receiving devices before discarding.
Re-init Delay Timer	The timer for the reinitializing delay
Tx Delay Timer	The timer for transmission
DCBX Version	The current DCBX version
Auto-Sense	States whether Auto-Sense is active.
Transmit TLVs	Describes what information is being transmitted for the TLV.
DCBX FCoE Priority Bits	Describes the current FCoE priority bit for DCBX.

## Examples

To display UDLD information for a specific Ethernet interface:

```
device# show udd interface ethernet 2/6
Global Admin State:  UDDL enabled

UDLD information for Ethernet 2/6
  UDLD Admin State:      Enabled
  Interface Operational State:  Bidirectional link
  Remote hello time:    Unknown
  Remote MAC Addr:      0024.3890.0d81
  Local system id:      0x9f01fee0
  Remote system id:     0x24900c00
  Local port :          2/6
  Remote port :         9/2
  Local link id:        0x0
  Remote link id:       0x0
  Last Xmt Seq Num:    43849
  Last Rcv Seq Num:    43880
```

# show uddl statistics

Shows UDLD statistics.

## Syntax

```
show uddl statistics [ interface [ ethernet slot/port ] ]
```

## Parameters

**ethernet**

Represents a valid, physical Ethernet type for all available Ethernet speeds.

*slot/port*

Specifies a valid slot and port number.

## Modes

Privileged EXEC mode

## Usage Guidelines

This command displays all unidirectional link detection (UDLD) protocol statistics or shows the statistics on a specified port.

## Examples

To show UDLD statistics on a specific Ethernet interface:

```
device# show uddl statistics interface ethernet 5/1
UDLD Interface statistics for Ethernet 5/1
Frames transmitted: 310
Frames received: 301
Frames discarded: 0
Frames with error: 0
Remote port id changed: 0
Remote MAC address changed: 0
```

# show users

Displays the users logged in to the system and locked user accounts.

## Syntax

```
show users
```

## Modes

Privileged EXEC mode

## Examples

The following example displays active user sessions and locked user accounts.

```
device# show users
**USER SESSIONS**
Username   Role   Host IP      Device   Time Logged In
jsmith     user   192.0.2.0    Cli      2016-04-30 01:59:35
jdoe       admin  192.0.2.1    Cli      2016-05-30 01:57:41

**LOCKED USERS**
testUser
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show version

Displays the current firmware version.

## Syntax

```
show version [ all-partitions ] [ brief ]
```

## Parameters

### all-partitions

Displays firmware information for both the active and the standby partitions. For each module, both partitions are displayed.

### brief

Displays a brief version of the firmware information.

## Modes

Privileged EXEC mode

## Usage Guidelines

Use this command to display firmware version information and build dates. The default command output includes the following information:

- Network Operating System Version—The firmware version number
- Firmware name—The label of the firmware image
- Build Time—The build date and time of the firmware
- Install time—The date and time of the firmware installation
- Host Version—The Linux host version.
- Host Kernel—The Linux kernel version
- Control Processor—The control processor model and memory

## Examples

To display the firmware version information for all partitions:

```
device# show version all-partitions

SLX-OS Operating System Software
SLX-OS Operating System Version: 17r.1.00
Copyright (c) 1995-2017 Brocade Communications Systems, Inc.
Firmware name:      17r.1.00_bfd_fix
Build Time:        23:24:03 Mar  3, 2017
Install Time:      18:54:34 Mar  4, 2017
BIOS Version:      5.11 built on 07/12/2016
ONIE Version:      2016.05.09-dirty (17r.1.00nhess_dv_drop11_merge_161013_1611)
Diag Version:      1.2.2.42 (17r.1.00nhess_dv_drop11_merge_161013_1611)
Kernel:           2.6.34.6
Host Version:      Ubuntu 14.04 LTS
Host Kernel:       Linux 3.14.17
```

```
Control Processor:  QEMU Virtual CPU version 2.0.0
```

```
System Uptime:     3days 1hrs 29mins 0secs
```

Slot	Name	Primary/Secondary Versions	Status
SW/0	SLX-OS	17r.1.00_bfd_fix 17r.1.00_bfd_fix	ACTIVE*

To display the firmware for all partitions in the brief view:

```
device# show version all-partitions brief
```

Slot	Name	Primary/Secondary Versions	Status
SW/0	SLX-OS	17r.1.00_bfd_fix 17r.1.00_bfd_fix	ACTIVE*

## History

Release version	Command history
16r.1.00	This command was introduced.

# show vlan brief

Displays basic information about switch VLAN interfaces. You can filter to display only provisioned or unprovisioned VLANs.

## Syntax

```
show vlan brief [ provisioned | unprovisioned ]
```

## Parameters

### provisioned

Displays provisioned VLANs.

### unprovisioned

Displays unprovisioned VLANs.

## Modes

Privileged EXEC mode

## Command Output

The **show vlan brief** command displays the following information:

Output field	Description
VLAN	Displays the <i>vlan_ID</i> .
Name	Displays one of the following strings: <ul style="list-style-type: none"> <li>• "default"</li> <li>• A name assigned to the VLAN using the <b>name</b> command</li> <li>• A default name automatically assigned to the VLAN, composed of "VLAN" and the <i>vlan_ID</i>. For example, if the <i>vlan_ID</i> is 1000, the default name is VLAN1000.</li> </ul>
State	Displays "ACTIVE" for provisioned VLANs or "INACTIVE" for unprovisioned VLANs.
Ports	Displays the ports on which the VLAN is applied.
Classification	(Available only for provisioned).



## Examples

The following example shows all VLANs that are configured, provisioned (active) and unprovisioned (inactive). VLAN 5800 was assigned the name "marketing."

```
switch# show vlan brief

Total Number of VLANs configured:    6
Total Number of VLANs unprovisioned: 0
Total Number of VLANs provisioned:   6
VLAN      Name          State  Ports          Classification
(F)-FCoE              (u)-Untagged,
(T)-Transparent        (t)-Tagged
(R)-RSPAN              (c)-Converged
=====
300        vlan300    ACTIVE  Eth 0/1(t)
5000(T)    vlan5000  ACTIVE  Eth 0/2/(t)   ctag 50, 60, 100-200
              Eth 0/1(t)     ctag 50, 60, 100-200
5500(T)    vlan5500  ACTIVE  Eth 0/3/(t)   ctag 1, 1002, 4093, 4095
5800      marketing  ACTIVE  Eth 0/2/(t)   ctag 800
6000(T)    vlan6000  ACTIVE  Eth 0/1/(t))
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# show vrf

Displays Virtual Routing and Forwarding (VRF) configuration information.

## Syntax

```
show vrf [ vrf-name | detail | interface interface ] ]
```

## Parameters

*vrf-name*

Specifies a named VRF. For the default VRF, enter **default-vrf**.

**detail**

Displays detailed information for all VRFs configured.

**interface** *interface*

Displays VRF information for an interface.

## Modes

Privileged EXEC mode

## Examples

The following example displays basic information for the default VRF.

```
device# show vrf default-vrf
VRF-Name: default-vrf, VRF-Id: 1
IP Router-Id: 50.50.50.1
Interfaces:
    Ve 40, Ve 84, Ve 85, Ve 150, Ve 211,
    Ve 501, Ve 503, Ve 504, Ve 505, Ve 1025,
    Ve 1059, Ve 2000, Lo 50
Address-family IPv4 unicast
    Max routes: -    Route count:134
    No import route-maps
    No export route-maps
Address-family IPv6 unicast
    Max routes: -    Route count:51
    No import route-maps
    No Export route-maps
```

The following example displays basic information for all VRFs.

```
device# show vrf
Total number of VRFs configured: 4
VrfName      VrfId  V4-Ucast  V6-Ucast
blue         3      Enabled   -
default-vrf  1      Enabled   Enabled
mgmt-vrf     0      Enabled   Enabled
red          2      -         Enabled
```

The following example displays detailed information for all VRFs.

```

device# show vrf detail
Total number of VRFs configured: 4

VRF-Name: blue, VRF-Id: 3
IP Router-Id: 10.1.1.10
Interfaces:
  Ve 200
Address-family IPv4 unicast
  Max routes:-   Route count:134
  No import route-maps
  No export route-maps

VRF-Name: default-vrf, VRF-Id: 1
IP Router-Id: 30.1.1.1
Interfaces:
  Ve 300
Address-family IPv4 unicast
  Max routes:-   Route count:51
  No import route-maps
  No export route-maps

Address-family IPv6 unicast
  Max routes:-   Route count:2
  No import route-maps
  No Export route-maps

VRF-Name: mgmt-vrf, VRF-Id: 0
IP Router-Id: 0.0.0.0
Interfaces:
  mgmt 1, Null0
Address-family IPv4 unicast
  Max routes:-   Route count:3
  No import route-maps
  No export route-maps

Address-family IPv6 unicast
  Max routes:-   Route count:2
  No import route-maps
  No Export route-maps

VRF-Name: red, VRF-Id: 2
IP Router-Id: 0.0.0.0
Interfaces:
  Ve 100
Address-family IPv6 unicast
  Max routes:-   Route count:2
  No import route-maps
  No Export route-maps

```

The following example indicates which VRFs are available on which interfaces.

```

device# show vrf interface
VrfName          Interfaces
blue             Ve 200
default-vrf      Ve 300
mgmt-vrf         mgmt 1, Null0
red              Ve 100

```

## History

Release version	Command history
16r.1.00	This command was introduced.

# show vrrp

Displays information about IPv4 VRRP and VRRP-E sessions.

## Syntax

**show vrrp**

**show vrrp** *VRID* [ **detail** | **summary** ]

**show vrrp detail**

**show vrrp interface** { **ethernet** *slot/port* | **ve** *vlan\_id* } [ **detail** | **summary** ]

**show vrrp summary** [ **vrf** { *vrf-name* | **all** } ]

## Parameters

*VRID*

The virtual group ID about which to display information. The range is from 1 through 16.

**detail**

Displays all session information in detail, including session statistics.

**summary**

Displays session-information summaries.

**interface**

Displays information for an interface that you specify.

**ethernet** *slot port*

Specifies a valid, physical Ethernet interface with a slot and port number.

**ve** *vlan\_id*

Specifies the VE VLAN number.

**vrf**

Specifies a VRF instance or all VRFs.

*vrf-name*

Specifies a VRF instance. For the default vrf, enter **default-vrf**.

**all**

Specifies all VRFs.

## Modes

Privileged EXEC mode

## Usage Guidelines

Use this command to display information about VRRP and VRRP-E sessions, either in summary or full-detail format. You can also specify a particular virtual group ID or interface for which to display output.

This command is for VRRP and VRRP-E. VRRP-E supports only the VE interface type.

To display information for VRRP sessions using the default VRF, you can use the **show vrrp summary** command syntax (with no additional parameters).

For the default or a named VRF, you can use the **show vrrp summary vrf** command syntax with the *vrf-name* option.

To display information for all VRFs, use the **show vrrp summary vrf all** command.

## Examples

The following example shows all VRRP session information in detail, including session statistics.

```
device# show vrrp detail

Total number of VRRP session(s)   : 2

VRID 14
  Interface: Ve 2018;  Ifindex: 1207961570
  Mode: VRRP
  Admin Status: Enabled
  Description :
  Address family: IPv4
  Version: 2
  Authentication type: No Authentication
  State: Master
  Session Master IP Address: Local
  Virtual IP(s): 10.18.1.100
  Virtual MAC Address: 0000.5e00.0112
  Configured Priority: unset (default: 100); Current Priority: 100
  Advertisement interval: 1 sec (default: 1 sec)
  Preempt mode: ENABLE (default: ENABLE)
  Hold time: 0 sec (default: 0 sec)
  Master Down interval: 4 sec
  Trackport:
    Port(s)                Priority  Port Status
    =====                =====  =====

Global Statistics:
=====
  Checksum Error : 0
  Version Error  : 0
  VRID Invalid   : 0

Session Statistics:
=====
  Advertisements           : Rx: 0, Tx: 49
  Gratuitous ARP           : Tx: 1
  Session becoming master  : 1
  Advts with wrong interval : 0
  Prio Zero pkts           : Rx: 0, Tx: 0
  Invalid Pkts Rvcd        : 0
  Bad Virtual-IP Pkts      : 0
  Invalid Authenticon type : 0
  Invalid TTL Value        : 0
  Invalid Packet Length    : 0

VRID 15
  Interface: Ve 2019;  Ifindex: 1207961571
  Mode: VRRP
  Admin Status: Enabled
  Description :
  Address family: IPv4
  Version: 2
  Authentication type: No Authentication
  State: Master
  Session Master IP Address: Local
  Virtual IP(s): 10.19.1.100
  Virtual MAC Address: 0000.5e00.0113
  Configured Priority: unset (default: 100); Current Priority: 100
  Advertisement interval: 1 sec (default: 1 sec)
  Preempt mode: ENABLE (default: ENABLE)
  Hold time: 0 sec (default: 0 sec)
  Master Down interval: 4 sec
  Trackport:
    Port(s)                Priority  Port Status
    =====                =====  =====

Global Statistics:
=====
```

```
Checksum Error : 0
Version Error  : 0
VRID Invalid   : 0
```

Session Statistics:

```
=====
Advertisements      : Rx: 0, Tx: 81
Gratuitous ARP      : Tx: 1
Session becoming master : 1
Advts with wrong interval : 0
Prio Zero pkts      : Rx: 0, Tx: 0
Invalid Pkts Rvcd   : 0
Bad Virtual-IP Pkts : 0
Invalid Authentication type : 0
Invalid TTL Value   : 0
Invalid Packet Length : 0
```

The following example displays summary information for VRRP statistics on the VRF named Marketing.

```
device# show vrrp summary vrf Marketing
```

```
Total number of VRRP session(s) : 1
Master session count : 1
Backup session count : 0
Init session count : 0
```

VRID	Session	Interface	Admin State	Current Priority	State	Short-path Forwarding	Revert Priority	SPF Reverted
14	VRRP	Ve 2018	Enabled	100	Master			

The following example displays summary information for VRRP statistics on all VRFs.

```
device# show vrrp summary vrf all
```

```
Total number of VRRP session(s) : 2
Master session count : 2
Backup session count : 0
Init session count : 0
```

VRID	Session	Interface	Admin State	Current Priority	State	Short-path Forwarding	Revert Priority	SPF Reverted
14	VRRP	Ve 2018	Enabled	100	Master			
15	VRRP	Ve 2019	Enabled	100	Master			

The following example displays summary information for VRRP statistics on the default VRF. (This command is equivalent to **show vrrp summary**.)

```
device# show vrrp summary vrf default-vrf
```

```
Total number of VRRP session(s) : 1
Master session count : 1
Backup session count : 0
Init session count : 0
```

VRID	Session	Interface	Admin State	Current Priority	State	Short-path Forwarding	Revert Priority	SPF Reverted
15	VRRP	Ve 2019	Enabled	100	Master			

The following example displays information for VRRP-E tracked networks.

```

device# show vrrp detail

Total number of VRRP session(s)   : 1

VRID 3
Interface: Ve 100;  Ifindex: 1207959652
Mode: VRRPE
Admin Status: Enabled
Description :
Address family: IPv4
Version: 2
Authentication type: No Authentication
State: Master
Session Master IP Address: Local
Virtual IP(s): 10.1.1.100
Virtual MAC Address: 02e0.523d.750a
Configured Priority: unset (default: 100); Current Priority: 100
Advertisement interval: 1 sec (default: 1 sec)
Preempt mode: DISABLE (default: DISABLED)
Advertise-backup: DISABLE (default: DISABLED)
Backup Advertisement interval: 60 sec (default: 60 sec)
Short-path-forwarding: Disabled
Revert-Priority: unset; SPF Reverted: No
Hold time: 0 sec (default: 0 sec)
Master Down interval: 4 sec
Trackport:
  Port(s)                Priority  Port Status
  =====                =====  =====

Tracknetwork:
  Network(s)              Priority  Status
  =====                =====  =====
  10.20.1.0/24            50      Up

Global Statistics:
=====
Checksum Error : 0
Version Error  : 0
VRID Invalid   : 0

Session Statistics:
=====
Advertisements           : Rx: 0, Tx: 35
Neighbor Advertisements  :           : Tx: 19
Session becoming master  : 1
Advts with wrong interval : 0
Prio Zero pkts           : Rx: 0, Tx: 0
Invalid Pkts Rvcd        : 0
Bad Virtual-IP Pkts      : 0
Invalid Authentication type : 0
Invalid TTL Value        : 0
Invalid Packet Length    : 0
VRRPE backup advt sent   : 0
VRRPE backup advt recvd  : 0

```

## History

Release version	Command history
16r.1.00	This command was introduced.



# Commands Shu - Z

---

## shutdown (interface)

Disables the current interface.

### Syntax

**shutdown**

**no shutdown**

### Command Default

The interface is disabled.

### Modes

Interface subtype configuration mode

### Usage Guidelines

Enter **no shutdown** to enable the interface.

If you use in-band management only, you may choose to shut down the management interface (which is considered out of band). When the management interface is shut down, all services (such as ping, scp, telnet, ssh, snmp, firmwaredownload, and supportsave) through the management interface IP. Management interface shutdown is a persistent configuration, meaning that the interface remains down after a system reboot or failover.

### Examples

To disable a specific Ethernet interface:

```
device# configure terminal
device(config)# interface ethernet 0/1
device(conf-if-eth-0/1)# shutdown
```

To enable a specific Ethernet interface:

```
device# configure terminal
device(config)# interface ethernet 0/2
device(conf-if-eth-0/2)# no shutdown
```

### History

Release version	Command history
16r.1.00	This command was introduced.

## site

Creates a remote Layer 2 extension site in a VXLAN overlay gateway context and accesses site configuration mode.

## Syntax

**site** *name*

**no site** *name*

## Parameters

*name*

Site identifier. An ASCII character string up to 63 characters long, including the alphabet, numbers 0 through 9, hyphens (-), and underscores (\_).

## Modes

Overlay gateway configuration mode

## Usage Guidelines

The VXLAN overlay gateway type must first be configured for Layer 2 extension, by means of the **type layer2-extension** command.

A site represents a remote fabric or the other end of the VXLAN tunnel. A site is associated with a "container," as data structure that includes the destination IPv4 address of the tunnel, the switchport VLANs, bridge domain, and the administrative state.

Use the **no site** command with a specified name to remove the tunnel that corresponds to the site. One you create the site instance, you enter VXLAN overlay gateway site configuration mode, where you can configure other properties for the site. The key commands available in this mode are summarized below:

**TABLE 7** Key commands available in VXLAN overlay gateway site configuration mode

Command	Description
<b>bfd</b>	Configures Bidirectional Forwarding Detection (BFD) on a tunnel in VXLAN overlay gateway configurations.
<b>bfd interval</b>	Configures BFD session parameters on a tunnel in VXLAN overlay gateway configurations.
<b>extend bridge-domain</b>	Configures a bridge domain for the tunnels to the containing site in a VXLAN overlay gateway configurations.
<b>extend vlan</b>	Configures switchport VLANs for the tunnels to the containing site in a VXLAN overlay gateway configurations.
<b>ip address</b>	Specifies the IPv4 address of a destination tunnel in VXLAN overlay gateway configurations.
<b>shutdown</b>	Administratively shuts down tunnels to a VXLAN overlay gateway site.

## Examples

The following example creates a VXLAN overlay gateway site and enters site configuration mode.

```
switch(config)# overlay-gateway gateway1
switch(config-overlay-gw-gateway1)# site mysite
switch(config-site-mysite)#
```

## History

Release version	Command history
17r.1.00	This command was introduced.
17r.1.01	Added bridge domain support information.

# snmp-server community

Sets the community string and associates it with the user-defined group name to restrict the access of MIB for SNMPv1 and SNMPv2c requests.

## Syntax

```
snmp-server community string [ group group-name ]
no snmp-server community string [ group group-name ]
```

## Command Default

None

## Parameters

*string*  
Specifies the community name string. Enter an alphanumeric string with 2 to 16 characters.

**group** *group-name*  
Specifies the group name associated with the community name.

## Modes

Global configuration mode

## Usage Guidelines

Use a **no** form of this command to remove an community string or the group from the community.  
The maximum number of SNMP communities supported is 256.

## Examples

The following example adds the community string named public and associates the group name named user with it.

```
device(config)# snmp-server community public groupname user
```

## History

Release version	Command history
16r. 1.00	This command was introduced.

# snmp-server contact

Sets the SNMP server contact string.

## Syntax

**snmp-server contact** *string* [ *location string* ] [ **sys-descr** *string* ]

**no snmp-server contact** *string* [ *location string* ] [ **sys-descr** *string* ]

## Command Default

The default contact string is BrocadeCommunicationSystem.

The default location string is BrocadeTcsHyd.

The default system description string is BrocadeSupport.

## Parameters

*string*

Specifies the server contact. Enter an alphanumeric string from 4 to 255 characters. You must enclose the text in double quotes if the text contains spaces.

**location** *string*

Specifies the SNMP server location string. Enter an alphanumeric string from 4 to 255 characters. You must enclose the text in double quotes if the text contains spaces.

**sys-descr** *string*

Specifies the Management Information Base (MIB-2) object identifier (OID) system description. Enter an alphanumeric string from 4 to 255 characters. You must enclose the text in double quotes if the text contains spaces.

## Modes

Global configuration mode

## Usage Guidelines

Use the **no** form of this command to reset the default value.

## Examples

The following example sets the SNMP server contact string to "Operator 12345".

```
device(config)# snmp-server contact "Operator 12345"
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# snmp-server context

Maps the context name in an SNMPv3 packet protocol data unit (PDU) to the name of a VPN routing and forwarding (VRF) instance.

## Syntax

```
snmp-server context context_name [ vrf-name vrf_name ]
no snmp-server context context_name [ vrf-name vrf_name ]
```

## Command Default

None

## Parameters

*context\_name*

Specifies the context name that is passed in the SNMP PDU.

**vrf-name** *vrf\_name*

Specifies the VRF instance that can be retrieved when an SNMP request is sent with the context name.

## Modes

Global configuration mode

## Usage Guidelines

Use the **no** form of the command to delete the SNMP server context.

For SNMPv1 and SNMPv2, you must map the context with the community string. The SNMP agent supports 256 contexts to support context-to-VRF mapping.

For SNMPv3, you only need to map the context with the VRF. The SNMPv3 request PDU itself provisions for the context. Only one context is allowed for each VRF instance.

### ATTENTION

SNMP SET requests work only on the default VRF.

## Examples

The following example configures an SNMP server context to a VRF for SNMPv1 or SNMPv2.

```
device# configure terminal
device(config)# snmp-server community public groupname admin
device(config)# snmp-server context mycontext vrf myvrf
device(config)# snmp-server mib community-map public context mycontext
```

The following example configures an SNMP server context to a VRF for SNMPv3.

```
device# configure terminal
device(config)# snmp-server context mycontext1 vrf myvrf1
```

## History

Release version	Command history
16r.1.00	This command was introduced.
16r.1.01	This command was modified to update the Usage Guidelines related to SNMP SET requests.



# snmp-server enable trap

Enables the SNMP traps.

## Syntax

`snmp-server enable trap`

`no snmp-server enable trap`

## Command Default

The SNMP server traps are enabled by default.

## Modes

Global configuration mode

## Usage Guidelines

Use the **no** form of this command to disable the SNMP traps.

## Examples

The following example disables the SNMP traps.

```
device# configure terminal
device(config)# no snmp-server enable trap
```

The following example enables the SNMP traps.

```
device# configure terminal
device(config)# snmp-server enable trap
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# snmp-server engineid local

Configures an SNMP engine ID for the SNMP agent.

## Syntax

```
snmp-server engineid local engine_id
no snmp-server engineid local
```

## Command Default

A default engine ID is generated during system start up.

## Modes

Global configuration mode

## Usage Guidelines

A reboot is necessary for the configured engine ID to become active.

Use the **no** form of the command to remove the configured engine ID from database.

## Examples

The following example configures an engine ID for the SNMP agent.

```
device(config)# snmp-server engineid local 10:00:00:05:33:51:A8:65:05:33:51:A8
```

The following example removes the configured engine ID from the database.

```
device(config)# no snmp-server engineid local
```

## History

Release version	Command history
16r.1.00	This command was introduced.

## snmp-server group

Creates user-defined groups for SNMPv1/v2/v3 and configures read, write, and notify permissions to access the MIB view.

### Syntax

```
snmp-server group groupname { v1 | v2c | v3 { auth | noauth | priv } } [ read viewname ] [ write viewname ] [ notify viewname ]
```

```
no snmp-server group groupname { v1 | v2c | v3 { auth | noauth | priv } } [ read viewname ] [ write viewname ] [ notify viewname ]
```

### Command Default

None

### Parameters

*groupname*

Specifies the name of the SNMP group to be created.

**v1 | v2c | v3**

Specifies the version of SNMP.

**auth | noauth | priv**

Specifies the various security levels for SNMPv3.

**auth**

Specifies the authNoPriv security level. Password authentication is used based on either MD5 or SHA hash authentication and no encryption is used for communications between the devices.

**noauth**

Specifies the noAuthNoPriv security level. If no security level is specified, noauth is the default. This security level means that there is no authentication password exchanged and the communications between the agent and the server are not encrypted. The SNMP requests are authorized based on a username string match similar to the community string for SNMPv1/v2c.

**priv**

Specifies the authPriv security level. Password authentication is used based on either MD5 or SHA hash authentication and the communication between the agent and the server are also encrypted.

**read** *viewname*

Specifies the name of the view that enables you to provide read access.

**write** *viewname*

Specifies the name of the view that enables you to provide both read and write access.

**notify** *viewname*

Specifies the name of the view that enables you to provide access to the MIB for trap or inform.

## Modes

Global configuration mode

## Usage Guidelines

Maximum number of SNMP groups supported is 10.

## Examples

The following example creates SNMP server group entries for SNMPv3 user group with auth or noauth permission.

```
device(config)# snmp-server group group1 v3 auth read myview write myview notify myview
device(config)# snmp-server group group2 v3 noauth read all write all notify all
device(config)# snmp-server group group3 v3 auth
```

The following example removes the configured SNMP server groups.

```
device(config)# no snmp-server group test1 v3 auth
device(config)# no snmp-server group TEST1 v3 auth read myview write myview
device(config)# no snmp-server group TEST2 v3 noauth read all write all notify all
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# snmp-server host

Configures the SNMP trap server host attributes.

## Syntax

```
snmp-server host { ipv4_host | ipv6_host | dns_host } community_string [ version { 1 | 2c } ] [ udp-port port ] [ severity-level |
{ none | debug | info | warning | error | critical } ] [ use-vrf vrf-name ]
```

```
no snmp-server host { ipv4_host | ipv6_host | dns_host } community_string [ version { 1 | 2c } ] [ udp-port port ] [ severity-
level | { none | debug | info | warning | error | critical } ] [ use-vrf vrf-name]
```

## Parameters

**host** { *ipv4\_host* | *ipv6\_host* | *dns\_host* }

Specifies the IP address of the host. IPv4, IPv6, and DNS hosts are supported.

*community\_string*

Specifies the community string associated with the host entry. The number of characters available for the string ranges from 1 through 64.

**version** { *1* | *2c* }

Selects version 1 or 2c traps to be sent to the specified trap host.

**udp-port** *port*

Specifies the UDP port where SNMP traps will be received. Valid port IDs range from 0 through 65535. The default port is 162.

**severity-level** { *none* | *debug* | *info* | *warning* | *error* | *critical* }

Provides the ability to filter traps based on severity level on both the host and the SNMPv3 host. Only RASLog (swEvent) traps can be filtered based on severity level. The configured severity level marks the reporting threshold. All messages with the configured severity or higher are displayed. If the severity level of **none** is specified, all traps are filtered and no RASLog traps are received.

**use-vrf** *vrf-name*

Specifies a VRF through which to communicate with the SNMP host. By default, all management services are enabled on the management VRF ("mgmt-vrf") and the default VRF ("default-vrf").

## Modes

Global configuration mode

## Usage Guidelines

This command sets the trap destination IP addresses and SNMP version, associates a community string with a trap host community string (for v1 and v2c), and specifies the UDP destination port where SNMP traps will be received.

To configure SNMP trap hosts associated with community strings, you must create the community string using the **snmp-server community** command before configuring the host.

The host supports six communities and their associated trap recipients and trap recipient severity levels. The default value for the trap recipient of each community is 0.0.0.0. The length of the community string should be between 2 and 64 characters.

The `no snmp-server host host community-string string version 2c` command brings version 2c down to version 1.

The `no snmp-server host host community-string string` command removes the SNMP server host from the device configuration altogether.

## Examples

The following example creates an entry for trap host 1050:0:0:0:5:600:300c:326b associated with community "public." The trap host receives traps from the configured device.

```
device(config)# snmp-server host 1050:0:0:0:5:600:300c:326b public severity-level Info
```

The following example creates an entry for trap host brcd.extremenetworks.com associated with community "public." The trap host receives traps from the configured device.

```
device(config)# snmp-server host brcd1.extremenetworks.com public severity-level info
```

The following example associates "commaccess" as a read-only community and set 10.32.147.6 as a trap recipient with SNMP version 2c on target port 162.

```
device(config)# snmp-server host 10.32.147.6 commaccess version 2c udp-port 162
```

The following example creates a trap host (10.23.23.45) associated with the community "public", which will receive all traps with the severity level of Info.

```
device(config)# snmp-server host 10.23.23.45 public severity-level info
```

The following example resets the severity level to None.

```
device(config)# snmp-server host 10.23.23.45 public severity-level none
```

The following example specifies a VRF to communicate with the host.

```
device(config)# snmp-server host 10.24.61.10 public use-vrf myvrf
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# snmp-server location

Sets the SNMP server location string.

## Syntax

```
snmp-server location string [ contact string ] [ sys-descr string ]
```

```
no snmp-server location string [ contact string ] [ sys-descr string ]
```

## Command Default

The default location string is BrocadeTcsHyd.

The default contact string is BrocadeCommunicationSystem.

The default system description string is BrocadeSupport.

## Parameters

### **location** *string*

Specifies the SNMP server location string. Enter an alphanumeric string from 4 to 255 characters. You must enclose the text in double quotes if the text contains spaces.

### **contact** *string*

Specifies the server contact. Enter an alphanumeric string from 4 to 255 characters. You must enclose the text in double quotes if the text contains spaces.

### **sys-descr** *string*

Specifies the Management Information Base (MIB-2) object identifier (OID) system description. Enter an alphanumeric string from 4 to 255 characters. You must enclose the text in double quotes if the text contains spaces.

## Modes

Global configuration mode

## Usage Guidelines

Use the **no** form of this command to reset the default value.

## Examples

The following example sets the SNMP server location string to "Building 3 Room 214".

```
device(config)# snmp-server location "Building 3 Room 214"
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# snmp-server mib community-map

Maps an SNMP community string to an SNMP context.

## Syntax

```
snmp-server mib community-map community-name context context-name
no snmp-server mib community-map community-name context context-name
```

## Command Default

None

## Parameters

*community-name*  
Specifies an SNMP community name.

**context** *context-name*  
Specifies an SNMP context.

## Modes

Global configuration mode

## Usage Guidelines

Use the **no** form of this command to remove a community string and its associated context name.

Any incoming SNMPv1/v2c requests with the specified community name uses the context name specified by this command. The context name can be used in SNMP requests for "ipCidrRouteTable."One community can be mapped to only one context. However, a single context can be mapped to multiple communities.

Before mapping the community to context, a valid context should be configured by using the **snmp-server context** command and a valid community string should be configured by using the **snmp-server community** command.

## Examples

The following example maps an SNMP community string to a context name.

```
device# configure terminal
device(config)# snmp-server mib community-map public context mycontext
```

The following example removes an SNMP community string and its associated context name.

```
device(config)# no snmp-server mib community-map public context mycontext
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# snmp-server sys-descr

Sets the Management Information Base (MIB-2) object identifier (OID) system description.

## Syntax

```
snmp-server sys-descr string [ contact string ] [ location string ]
```

```
no snmp-server sys-descr string [ contact string ] [ location string ]
```

## Command Default

The default system description string is BrocadeSupport.

The default contact string is BrocadeCommunicationSystem.

The default location string is BrocadeTcsHyd.

## Parameters

*string*

Specifies the system description. Enter an alphanumeric string from 4 to 255 characters. You must enclose the text in double quotes if the text contains spaces.

**contact** *string*

Specifies the server contact. Enter an alphanumeric string from 4 to 255 characters. You must enclose the text in double quotes if the text contains spaces.

**location** *string*

Specifies the SNMP server location string. Enter an alphanumeric string from 4 to 255 characters. You must enclose the text in double quotes if the text contains spaces.

## Modes

Global configuration mode

## Usage Guidelines

Use the **no** form of this command to reset the default value.

## Examples

The following example sets the system description OID to "Extreme Cluster device".

```
device(config)# snmp-server sys-descr "Extreme Cluster device"
```

## History

Release version	Command history
16r.1.00	This command was introduced.

## snmp-server user

Creates or changes the attributes of SNMPv3 users, and allows the SNMPv3 user to be associated with the user-defined group name.

### Syntax

```
snmp-server user username [ groupname group-name ] [ auth { md5 | sha | noauth } ] [ auth-password string [ encrypted ] ]
  [ priv { DES | AES128 | nopriv } ] [ priv-password string [ encrypted ] ]
```

```
no snmp-server user username [ groupname group-name ] [ auth { md5 | sha | noauth } ] [ auth-password string
  [ encrypted ] ] [ priv { DES | AES128 | nopriv } ] [ priv-password string [ encrypted ] ]
```

### Command Default

None

### Parameters

#### *username*

The name of the user that connects to the agent. The name must be between 1 and 16 characters long.

#### **groupname** *group-name*

The name of the group to which the user is associated. The configured user is allowed to be associated with the user-defined groups created using the **snmp-server group** command.

#### **auth**

Initiates an authentication level setting session. The default level is **noauth** .

#### **noauth**

Specifies "No Authentication Protocol".

#### **md5**

The HMAC-MD5-96 authentication level.

#### **sha**

The HMAC-SHA-96 authentication level.

#### **auth-password** *string*

A string that enables the agent to receive packets from the host. Passwords are plain text and must be added each time for each configuration replay. The password must be between 1 and 32 characters long.

#### **priv**

Initiates a privacy authentication level setting session. The default level is **nopriv** .

#### **DES**

Specifies the DES privacy protocol.

#### **AES128**

Specifies the AES128 privacy protocol.

#### **nopriv**

Specifies "No Privacy Protocol".

**priv-password** *string*

Specifies a string (not to exceed 32 characters) that enables the host to encrypt the contents of the message that it sends to the agent. Passwords are plain text and must be added each time for each configuration replay. The privacy password alone cannot be configured. You configure the privacy password with the authentication password.

**encrypted**

Encrypts the input for auth/priv passwords. The encrypted key should be used only while entering the encrypted auth/priv passwords.

## Modes

Global configuration mode

## Usage Guidelines

This command configures SNMPv3 users that can be associated with a trap and inform response functionality. This command also allows configured user to be associated with user-defined SNMP groups created using the **snmp-server group** command. The maximum number of SNMP users that can be configured is 10. Optional encryption for **auth-password** and **priv-password** is also provided.

When creating a new SNMPv3 user without group name, by default there is no group name mapped with the SNMPv3 user. You must map the configured SNMPv3 user with any non-existing or existing group name available in the group CLI configuration to contact the device through SNMPv3.

This command may not be successful where encrypted passwords are generated by third-party or open-source tools.

Use a **no** form of this command to do one of more of the following:

- Remove the specified user and all entities associated with it
- Remove the groupname from the user

## Examples

The following example configures a basic authentication policy.

```
device(config)# snmp-server user extreme groupname snmpadmin auth md5 auth-password user123 priv AES128
priv-password user456
```

The following example configures plain-text passwords.

```
device(config)# snmp-server user snmpadmin1 auth md5 auth-password private123 priv DES priv-password
public123
```

The following example configures configure encrypted passwords.

```
device(config)# snmp-server user snmpadmin2 groupname snmpadmin auth md5 auth-password "MVb
+360X3kcfBzug5Vo6dQ==\n" priv DES priv-password "ckJFoHbzVvhR0xFRPjsMTA==\n" encrypted
```

The following example creates the SNMP users "user1" and "user2" associated with user-defined group "group1" under global configuration mode.

```
device(config)# snmp-server user user1 groupname group1
device(config)# snmp-server user user2 groupname group1 auth md5 auth-password password priv DES priv-
password password
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# snmp-server v3host

Specifies the host recipient for SNMPv3 trap notification.

## Syntax

```
snmp-server v3host { ipv4_host | ipv6_host | dns_host } user_name [ notifytype { traps | informs } ] [ engineid engine-id ]
  [ udp-port port_number ] [ severity-level | { none | debug | info | warning | error | critical } ] [ use-vrf { vrf-name } ]
no snmp-server v3host { ipv4_host | ipv6_host | dns_host } user_name [ notifytype {traps | informs}] [ engineid engine-id ]
  [ udp-port port_number ] [ severity-level | {none | debug | info | warning | error | critical } ] [ use-vrf ]
```

## Parameters

**ipv4\_host | ipv6\_host | dns\_host**

Specifies the IP address of the host. IPv4, IPv6, and DNS hosts are supported.

*user\_name*

Specifies the SNMPv3 user name to be associated with the SNMPv3 host entry.

**notifytype traps | informs**

Specifies the type of notification traps that are sent for the host. Traps and informs are supported. The default notify type is traps.

**engineID engine-id**

Configures the remote engine ID to receive informs on a remote host.

**udp-port port\_number**

Specifies the UDP port of the host. The default UDP port number is 162.

**severity-level { none | debug | info | warning | error | critical }**

Provides the ability to filter traps based on severity level on both the host and the SNMPv3 host. Only RASLog (swEvent) traps can be filtered based on severity level. The configured severity level marks the reporting threshold. All messages with the configured severity or higher are displayed. If the severity level of None is specified, all traps are filtered and no RASLog traps are received. The default severity level is none.

**use-vrf vrf-name**

Configures SNMP to use the specified VRF to communicate with the host. The default is mgmt-vrf.

## Modes

Global configuration mode

## Usage Guidelines

You can associate a global SNMPv3 host only with global SNMPv3 users and the local SNMPv3 host only with local SNMPv3 users. You cannot create a SNMPv3 host by associating with the local SNMPv3 users and vice versa.



## Examples

The following example creates an entry for SNMPv3 trap IPv4 host 10.23.23.45 associated with SNMP user "snmpadmin1."

```
device(config)# snmp-server v3host 10.23.23.45 snmpadmin1 severity-level info
```

The following example creates an entry for SNMPv3 trap IPv6 host 1050:0:0:0:5:600:300c:326b associated with SNMP user "snmpadmin2." The trap host receives SNMPv3 traps from the configured device.

```
device(config)# snmp-server v3host 1050::5:600:300c:326b snmpadmin2 severity-level Info
```

The following example associates the default-vrf VRF for a trap host recipient.

```
device(config)# snmp-server v3host 10.24.61.10 public use-vrf default-vrf
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# snmp-server view

Creates a view entry with MIB object IDs to be included or excluded for user access.

## Syntax

**snmp-server view** *view-name* *mib\_tree* **included** | **excluded**

**no snmp-server view** *view-name* *mib\_tree* **included** | **excluded**

## Command Default

None

## Parameters

*view-name*

Specifies the alphanumeric name to identify the view. The name should not contain spaces.

*mib\_tree*

Specifies the MIB object ID called Object Identifiers (OIDs) that represent the position of the object or sub-tree in the MIB hierarchy.

**included** | **excluded**

Specifies whether the specified MIB object ID must be included in the view or excluded from the view.

## Modes

Global configuration mode

## Usage Guidelines

The maximum number of views supported with MIB tree entries is 10. Either a single view name associated with 10 different MIB object IDs or 10 different view names associated with each one of the MIB object IDs is allowed.

## Examples

The following example creates an SNMP view entry "view1" with excluded permission for the MIB object ID "1.3.6.1.2.1.1.3":

```
device(config)# snmp-server view view1 1.3.6.1.2.1.1.3 excluded
```

The following example creates an SNMP view entry "view2" with included permission for the MIB object ID "1.3.6.1.":

```
device(config)# snmp-server view view2 1.3.6.1 included
```

The following example removes the SNMP view entry "view1" from the configuration list.

```
device(config)# no snmp-server view view1 1.3.6.1.2.1.1.3 excluded
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# soft-preemption

The **soft-preemption** command enables soft preemption functionality. This command must be used on both the primary and secondary paths.

## Syntax

```
soft-preemption
no soft-preemption
```

## Command Default

The soft-preemption function is disabled.

## Modes

MPLS LSP configuration mode.

## Usage Guidelines

The **no** function disables soft preemption for the path on which the command is executed.

## Examples

The following example shows how configure a primary path.

```
device# configure
device(config)# router mpls
device(config-router-mpls)# lsp test
device(config-router-mpls-lsp-test)# soft-preemption
```

The following example shows how to configure a secondary path.

```
device# configure
device(config)# router mpls
device(config-router-mpls)# lsp test
device(config-router-mpls-lsp-test)# secpath sec
device(config-router-mpls-lsp-test-secpath-sec)# soft-preemption
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# soft-preemption cleanup-timer

Sets the amount of time that the point of preemption must wait to receive the path tear notification from the ingress LSR before sending a hard preemption path error.

## Syntax

```
soft-preemption { cleanup-timer | value }
no soft-preemption { cleanup-timer | value }
```

## Command Default

The soft-preemption cleanup-timer is disabled on the router.

## Parameters

**cleanup-timer** *value*

The *value* is the time the point of preemption must wait to receive the path tear notification from the ingress LSR, before sending a hard preemption path error. Values ranging from 1 - 29 are not valid values for this timer. The default setting is 30 seconds. The acceptable range for this timer is 30 - 300. A value of 0 indicates soft preemption is disabled on the router.

## Modes

MPLS policy mode.

## Usage Guidelines

The **no** function returns the timer value settings to the default setting (30 seconds).

## Examples

The following example configures the soft-preemption cleanup-timer to 30 seconds, which is the default setting.

```
device# configure
device(config)# router mpls
device(config-router-mpls)# policy
device(config-router-mpls-policy)# soft-preemption cleanup-timer 30
```

## History

Release version	Command history
16r.1.00	This command was introduced.

## source

Configures the source address or a source interface for a tunnel interface.

## Syntax

```
source { ip-address | ethernet slot/port | loopback number | ve vlan_id }  
no source
```

## Command Default

No source address or interface is configured.

## Parameters

*ip-address*  
Specifies the IPv4 address of an interface.

**ethernet** *slot/port*  
Specifies an Ethernet interface.

**loopback** *number*  
Specifies a loopback port.

**ve** *vlan\_id*  
Specifies a VE interface.

## Modes

Interface tunnel configuration mode

## Usage Guidelines

The maximum number of tunnel source supported is 16.

Use the **no source** command to remove the configured source for the tunnel interface.

The tunnel source address should be one of the router IP addresses configured on a physical, loopback, or VE interface, through which the other end of the tunnel is reachable. The source interface must have at least one IP address configured on it.

When the physical/ve interface is specified as the source of the GRE tunnel, the lowest IP address of that interface is used as the tunnel source IP address. If the smallest IP address is removed from the interface, the next smallest IP address is used as the tunnel source.

## Examples

This example configures the source address for the tunnel interface.

```
device# configure terminal  
device(config)# interface tunnel 5  
device(config-intf-tunnel-5)# source 10.1.2.4
```

This example sets an Ethernet interface as a source tunnel.

```
device# configure terminal
device(config)# interface tunnel 3
device(config-intf-tunnel-3)# source ethernet 3/1
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# source-interface

Configures a source IP address for Remote Authentication Dial-In User Service (RADIUS) packets that originate on the device.

## Syntax

```
source-interface { ethernet | loopback | management { 0 | 1 } | ve ve-num }
no source-interface
```

## Command Default

When a source interface is not configured for a RADIUS host, the IP address of the interface through which a RADIUS packet exits the device is used in the IP header as the source IP address.

## Parameters

### ethernet

Causes the ethernet interface to be used as the source interface for RADIUS packets that originate on the device.

### loopback

Causes the loopback interface to be used as the source interface for RADIUS packets that originate on the device.

### management

Causes a management interface to be used as the source interface for RADIUS packets that originate on the device.

### 0

Causes the chassis IP address to be used as the source IP address.

### 1

Causes the MM1 IP address to be used as the source IP address.

### ve *ve-num*

Specifies a virtual ethernet interface value to be used as the source interface for RADIUS packets that originate on the device.

## Modes

RADIUS server host VRF configuration mode

## Usage Guidelines

### NOTE

When an interface without an IP address is configured as the source interface, the egress interface IP address is used as the source interface.

### NOTE

The source interface configuration should not conflict with the VRF specified for communications with the RADIUS server host; when the specified source interface is not part of the VRF configured for communications with the RADIUS server host, the egress interface IP address is used as the source interface.



Modifications to the interface (such as changing the IP address, VRF, and so on) that is configured as the source interface, do not affect existing connections unless the corresponding link is dropped due to these changes.

The **no** form of the command restores the command default value.

## Examples

The following example shows how to configure an Ethernet interface (0/2) as the source interface for RADIUS packets that originate on the device and are destined for the RADIUS server host 10.37.73.180.

```
device# configure terminal
device(config)# radius-server host 10.37.73.180 use-vrf green-vrf
device(config-host-10.37.73.180/green-vrf)# source-interface ethernet 0/2
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# spanning-tree autoedge

Enables automatic edge detection.

## Syntax

`spanning-tree autoedge`

`no spanning-tree autoedge`

## Command Default

Auto detection is not enabled.

## Modes

Interface configuration mode

## Usage Guidelines

The port can become an edge port if no Bridge Protocol Data Unit (BPDU) is received.

## Examples

To enable automatic edge detection:

```
device# configure terminal
device(config)# interface ethernet 1/5
device(conf-if-eth-1/5)# spanning-tree autoedge
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# spanning-tree bpdu-mac

Sets the MAC address of the Bridge Protocol Data Unit (BPDU).

## Syntax

```
spanning-tree bpdu-mac [ 0100.0ccc.cccd | 0304.0800.0700 ]
no spanning-tree bpdu-mac [ 0100.0ccc.cccd | 0304.0800.0700 ]
```

## Parameters

```
0100.0ccc.cccd
    Cisco Control Mac
0304.0800.0700
    Extreme Control Mac
```

## Modes

Interface configuration mode

## Usage Guidelines

This command will only take effect when the protocol is PVST+ or R-PVST+.

Extreme devices support PVST+ and R-PVST+ only. The PVST and R-PVST protocols are proprietary to Cisco and are not supported.

Enter **no spanning-tree bpdu-mac 0100.0ccc.cccd** to remove the address.

## Examples

To set the MAC address of the BPDU:

```
device# configure terminal
device(config)# interface ethernet 1/5
device(conf-if-eth-1/5)# spanning-tree bpdu-mac 0100.0ccc.cccd
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# spanning-tree cost

Changes an interface's spanning-tree port path cost.

## Syntax

**spanning-tree cost** *cost*

**no spanning-tree cost** *cost*

## Command Default

The default path cost is 200000000.

## Parameters

*cost*

Specifies the path cost for the Spanning Tree Protocol (STP) calculations. Valid values range from 1 through 200000000.

## Modes

Interface configuration mode

## Usage Guidelines

Lower path cost indicates a greater chance of becoming root.

## Examples

To set the port cost to 128:

```
device# configure terminal
device(config)# interface ethernet 1/5
device(conf-if-eth-1/5)# spanning-tree cost 128
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# spanning-tree edgeport

Enables the edge port on an interface to allow the interface to quickly transition to the forwarding state.

## Syntax

```
spanning-tree edgeport [ bpdu-guard ]
```

```
no spanning-tree edgeport [ bpdu-guard ]
```

## Command Default

Edge port is disabled.

## Parameters

**bpdu-guard**

Guards the port against the reception of BPDUs.

## Modes

Interface subtype configuration mode

## Usage Guidelines

This command is only for RSTP and MSTP. Use the **spanning-tree portfast** command for STP.

Note the following details about edge ports and their behavior:

- A port can become an edge port if no BPDU is received.
- A port must become an edge port before it receives a BPDU.
- When an edge port receives a BPDU, it becomes a normal spanning-tree port and is no longer an edge port.
- Because ports directly connected to end stations cannot create bridging loops in the network, edge ports directly transition to the forwarding state, and skip the listening and learning states.

## Examples

To enable a port to quickly transition to the forwarding state:

```
device# configure terminal
device(config)# interface ethernet 1/5
device(conf-if-eth-1/5)# spanning-tree edgeport
```

To guard the port against reception of BPDUs:

```
device# configure terminal
device(config)# interface ethernet 1/5
device(conf-if-eth-1/5)# spanning-tree edgeport
device(conf-if-eth-1/5)# spanning-tree edgeport bpdu-guard
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# spanning-tree guard root

Enables the guard root to restrict which interface is allowed to be the spanning tree root port or the device's path-to-the-root.

## Syntax

```
spanning-tree guard root [ vlan vlan_id ]
no spanning-tree guard root
```

## Command Default

Guard root is disabled.

## Parameters

**vlan *vlan\_id***  
Specifies a VLAN.

## Modes

Interface configuration mode

## Usage Guidelines

Guard root protects the root bridge from malicious attacks and unintentional misconfigurations where a bridge device that is not intended to be the root bridge becomes the root bridge. This causes severe bottlenecks in the data path. Guard root ensures that the port on which it is enabled is a designated port. If the guard root enabled port receives a superior Bridge Protocol Data Unit (BPDU), it goes to a discarding state.

If the VLAN parameter is not provided, the guard root functionality is applied globally for all per-VLAN instances. But for the VLANs which have been configured explicitly, the per-VLAN configuration takes precedence over the global configuration.

The root port provides the best path from the switch to the root switch.

## Examples

To enable guard root:

```
device# configure terminal
device(config)# interface ethernet 1/5
device(conf-if-eth-1/5)# spanning-tree guard root
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# spanning-tree link-type

Enables and disables the rapid transition for the Spanning Tree Protocol (STP).

## Syntax

```
spanning-tree link-type [ point-to-point | shared ]
```

## Command Default

The `spanning-tree link-type` is set to `point-to-point`.

## Parameters

### point-to-point

Enables rapid transition.

### shared

Disables rapid transition.

## Modes

Interface subtype configuration mode

## Usage Guidelines

This command overrides the default setting of the link type.

## Examples

To specify the link type as shared:

```
device# configure terminal
device(config)# interface ethernet 1/5
device(conf-if-eth-1/5)# spanning-tree link-type shared
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# spanning-tree portfast

Enables the Port Fast feature on an interface to allow the interface to quickly transition to forwarding state.

## Syntax

```
spanning-tree portfast [ bpdu-guard ]
no spanning-tree portfast [ bpdu-guard ]
```

## Command Default

Port Fast is disabled.

## Parameters

**bpdu-guard**  
Guards the port against the reception of BPDUs.

## Modes

Interface subtype configuration mode

## Usage Guidelines

This command is applicable the only for the Spanning Tree Protocol (STP). Port Fast immediately puts the interface into the forwarding state without having to wait for the standard forward time. Use the **spanning-tree edgeport** command for MSTP and RSTP.

BPDU guard disables all portfast-enabled ports should they ever receive BPDU frames. It does not prevent transmitting of BPDU frames.

If you enable **spanning-tree portfast bpdu-guard** on an interface and the interface receives a BPDU, the software disables the interface and puts the interface in the ERR\_DISABLE state.

Enable Port Fast on ports connected to host. Enabling Port Fast on interfaces connected to switches, bridges, hubs, and so on can cause temporary bridging loops, in both trunking and nontrunking mode.

## Examples

To enable a port to quickly transition to the forwarding state:

```
device# configure terminal
device(config)# interface ethernet 1/5
device(conf-if-eth-1/5)# spanning-tree portfast
```

To guard the port against reception of BPDUs:

```
device# configure terminal
device(config)# interface ethernet 1/5
device(conf-if-eth-1/5)# spanning-tree portfast
device(conf-if-eth-1/5)# spanning-tree portfast bpdu-guard
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# spanning-tree priority

Changes an interface's spanning-tree port priority.

## Syntax

```
spanning-tree priority priority
no spanning-tree priority
```

## Command Default

The default value is 128.

## Parameters

*priority*

Specifies the interface priority for the spanning tree. The range of valid values is from 0 through 240. Port priority is in increments of 16.

## Modes

Interface subtype configuration mode

## Usage Guidelines

Enter **no spanning-tree priority** to return to the default setting.

## Examples

To configure the port priority to 16:

```
device# configure terminal
device(config)# interface ethernet 1/5
device(conf-if-eth-1/5)# spanning-tree priority 16
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# spanning-tree restricted-role

Restricts the role of the port from becoming a root port.

## Syntax

```
spanning-tree restricted-role  
no spanning-tree restricted-role
```

## Command Default

The restricted role is disabled.

## Modes

Interface configuration mode

## Usage Guidelines

Enter **no spanning-tree restricted-role** to return to the default setting.

## Examples

To configure the port from becoming a root port:

```
device# configure terminal  
device(config)# interface ethernet 1/5  
device(conf-if-eth-1/5)# spanning-tree restricted-role
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# spanning-tree restricted-tcn

Restricts the Topology Change Notification (TCN) Bridge Protocol Data Units (BPDUs) sent on the port.

## Syntax

`spanning-tree restricted-tcn`

`no spanning-tree restricted-tcn`

## Command Default

The restricted TCN is disabled.

## Modes

Interface configuration mode

## Usage Guidelines

Enter `no spanning-tree restricted-tcn` to disable this parameter.

## Examples

To restrict the TCN on a specific interface:

```
device# configure terminal
device(config)# interface ethernet 1/5
device(conf-if-eth-1/5)# spanning-tree restricted-tcn
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# spanning-tree shutdown

Enables or disables spanning tree on the interface or VLAN.

## Syntax

**spanning-tree shutdown**

**no spanning-tree shutdown**

## Command Default

Spanning tree is disabled by default.

## Modes

Interface (Ethernet or VLAN) configuration mode

## Usage Guidelines

Enter **no spanning-tree shutdown** to enable spanning tree on the interface or VLAN.

Once all of the interfaces have been configured for a VLAN, you can enable Spanning Tree Protocol (STP) for all members of the VLAN with a single command. Whichever protocol is currently selected is used by the VLAN. Only one type of STP can be active at a time.

A physical interface (port) can be a member of multiple VLANs. For example, a physical port can be a member of VLAN 1002 and VLAN 55 simultaneously. In addition, VLAN 1002 can have STP enabled and VLAN 55 can have STP disabled simultaneously.

Vlan 1002 can not be enabled with the **spanning-tree shutdown** command.

## Examples

To disable spanning tree on a specific interface:

```
device# configure terminal
device(config)# interface ethernet 1/5
device(conf-if-eth-1/5)# spanning-tree shutdown
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# speed (Ethernet)

Sets the speed negotiation value on an Ethernet interface.

## Syntax

```
speed { 100 | 1000 | 1000-auto | 10000 | auto }
```

## Command Default

The speed is set to **auto**.

## Parameters

**100**

Forces the speed to 100 Mbps.

**1000**

Forces the speed to 1 Gbps.

**1000-auto**

Forces the speed to 1 Gbps AN (802.3 Clause 37 Auto-Negotiation)

**10000**

Forces the speed to 10 Gbps.

**auto**

Allows the interface to negotiate the speed setting.

## Modes

Interface subtype configuration mode

## Usage Guidelines

Use the **auto** keyword to reset the default setting.

Only the SLX 9850 72X10G line card supports 10G/1G auto negotiation and auto detection mode.

## Examples

The following example changes the speed to 1G with auto negotiation.

```
device# configure terminal
device(config)# interface Ethernet 2/1
device(config-if-eth-2/1)# speed 1000-auto
device(config-if-eth-2/1)# no shutdown
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# spf-interval

Changes the shortest path first (SPF) interval.

## Syntax

```
spf-interval { level-1 | level-2 } max-wait initial-wait second-wait
no spf-interval
```

## Parameters

### level-1

Specifies Level 1 packets only.

### level-2

Specifies Level 2 packets only.

### max-wait

Specifies the maximum interval between SPF recalculations in seconds. The range is from 0 through 120 seconds. The default is 5 seconds.

### initial-wait

Specifies the initial SPF calculation delay in milliseconds after an LSP change. The range is from 0 through 120000 milliseconds. The default is 5000 milliseconds (5 seconds).

### second-wait

Indicates the hold time between the first and second SPF calculations in milliseconds. The range is from 1 through 120000 milliseconds. The default is 5000 milliseconds (5 seconds).

## Modes

IS-IS router configuration mode

## Usage Guidelines

The **no** form of the command restores the defaults.

## Examples

The following example specifies that the maximum interval in seconds between SPF recalculations is 15 seconds for Level 1 packets. The initial SPF calculation delay is 10000 milliseconds, and the hold time between the first and second SPF calculations is 15000 milliseconds.

```
device# configure terminal
device(config)# router isis
device(config-isis-router)# spf-interval level-1 15 10000 15000
```

The following example restores the defaults.

```
device# configure terminal
device(config)# router isis
device(config-isis-router)# no spf-interval
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# spt-threshold

Sets the threshold for switching to the shortest-path-tree.

## Syntax

```
spt-threshold { rangeseconds | infinity }
no spt-threshold
```

## Command Default

The default is 1 second.

## Parameters

**range**  
Specifies the traffic rate in frames per second. The range is 1 through 4294967295.

**infinity**  
Causes all sources to use the shared RP tree.

## Modes

Router PIM configuration mode.

## Usage Guidelines

## Examples

The following example specifies the traffic rate.

```
device(config)# router pim
device(config-pim-router)# spt-threshold 4294967
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ssh

Connects to a remote server by means of the Secure Shell (SSH) protocol.

## Syntax

```
ssh { IP_address | hostname } [ -c | -l | -m | interface { ethernet slot/port | management | ve vlan-id } | vrf vrf-name ] }
```

## Command Default

SSH connects to port 22.

## Parameters

*IP\_address*

Specifies the server IP address in IPv4 or IPv6 format.

*hostname*

Specifies the host name, a string from 1 through 253 characters.

**-c**

Specifies the encryption algorithm for the SSH session. This parameter is optional. Supported algorithms include the following:

**aes128-cbc**

AES 128-bits

**aes192-cbc**

AES 192-bits

**aes256-cbc**

AES 256-bits

**-l** *username*

Login name for the remote server. This parameter is optional. If you specify a user name, you will be prompted for a password. If you do not specify a user name, the command assumes you are logging in as root and will prompt for the root password.

**-m**

Specifies the HMAC (Hash-based Message Authentication Code) message encryption algorithm. This parameter is optional; if no encryption algorithm is specified, the default (**hmac-md5**) is used. Supported algorithms include the following:

**hmac-md5**

MD5 128-bits. This is the default setting.

**hmac-md5-96**

MD5 96-bits

**hmac-sha1**

SHA1 160-bits

**hmac-sha1-96**

SHA1 96-bits

**interface**

Specifies an interface.

**ethernet** *slot/port*

Specifies an Ethernet interface slot and port number. The v valid value is 0.

**management**

Specifies a management interface.

**ve** *vlan-id*

Range is from 1 through 4090 if Virtual Fabrics is disabled, and from 1 through 8191 if Virtual Fabrics is enabled.

**vrf** *vrf-name*

Specifies a VRF instance. See the Usage Guidelines.

## Modes

Privileged EXEC mode

## Usage Guidelines

Use this command to establish an encrypted SSH connection from a switch to a remote networking device. This implementation is based on SSH v2.

To use the **ssh** command on the management VRF, use the **vrf** keyword and enter **mgmt-vrf** manually.

The following features are not supported:

- Displaying SSH sessions
- Deleting stale SSH keys

## Examples

To connect to a remote device using an SSH connection with default settings:

```
device# ssh 10.70.212.152
```

```
The authenticity of host '10.70.212.152 (10.70.212.152)' can't be established.
RSA key fingerprint is f0:2a:7e:48:60:cd:06:3d:f4:44:30:2a:ce:68:fe:1d.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '10.70.212.152' (RSA) to the list of known hosts.
Password:
```

To connect to a remote device using an SSH connection with the management VRF:

```
device# ssh 10.70.212.152 vrf mgmt-vrf
```

To connect to a remote device using an SSH connection with a login name:

```
device# ssh -l admin 127.2.1.8
```

```
admin@127.2.1.8's password
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ssh client cipher

Sets the SSH client's cipher list for the SSH client.

## Syntax

`ssh client cipher string`

`no ssh client cipher`

## Parameters

*string*

The string name of the cipher. Refer to the device for the available options.

## Modes

Global configuration mode

## Usage Guidelines

Use the `no ssh client cipher` command remove the cipher list from the ssh client.

## Examples

Sets the SSH client's cipher list.

```
device# configure terminal
device(config)# ssh client cipher aes128-cbc
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ssh client cipher non-cbc

Sets the SSH client's cipher list to non-cbc ciphers for the SSH client.

## Syntax

`ssh client cipher non-cbc`

`no ssh client ciphe non-cbcr`

## Modes

Global configuration mode

## Usage Guidelines

Use the `no ssh client cipher non-cbc` command remove the non-cbc cipher list from the ssh client.

## Examples

Sets the SSH client's cipher list to non-cbc ciphers.

```
device# configure terminal
device(config)# ssh client cipher non-cbc
device(config)# do show running-config ssh
ssh server non-cbc
ssh client non-cbc
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# ssh client key-exchange

Specifies the method used for generating the one-time session keys for encryption and authentication with the Secure Shell (SSH) server and Diffie-Hellman group 14.

## Syntax

`ssh client key-exchange string`

`no ssh client key-exchange`

## Parameters

*string*

The string for the name of the algorithm `diffie-hellman-group14-sha1`, or a comma-separated list of supported Key-exchange algorithms; such as `diffie-hellman-group14-sha1,diffie-hellman-group1-sha1`, and so on.

## Command Default

This command is not configured by default.

## Modes

Global configuration mode

## Usage Guidelines

You can configure the SSH client key-exchange method to DH Group 14. When the `ssh client key-exchange` method is configured to DH Group 14, the SSH connection from a remote SSH client is allowed only if the key-exchange method at the client end is also configured to DH Group 14. Enter **no ssh client key-exchange** to restore `ssh client key-exchange` to the default value.

For information on DH Group 14, refer to [RFC 3526](#).

For backward compatibility, the string `"dh-group-14"` is also acceptable in place of `"diffie-hellman-group14-sha1"`

## Examples

To set `ssh client key-exchange` to DH Group 14:

```
device(config)#ssh client key-exchange diffie-hellman-group14-sha1
```

To restore the `ssh client key-exchange` to default value:

```
device(config)# no ssh client key-exchange
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ssh client mac

Supports MAC configurations for the SSH client.

## Syntax

`ssh client mac string`

`no ssh client mac`

## Command Default

SSH server is enabled by default.

## Parameters

*string*

The string name of the default MAC required. Your choices are hmac-md5, hmac-sha1, hmac-sha2-256, and hmac-sha2-512. The default MACs supported in FIPS mode are hmac-sha1, hmac-sha2-256, and hmac-sha2-512.

## Modes

Global configuration mode

## Usage Guidelines

The MAC hmac-md5 is not supported in FIPS mode.

## Examples

Typical command example:

```
device# configure terminal
device(config)# ssh client mac hmac-sha1,hmac-sha2-256,hmac-sha2-512
device(config)# do show running-config ssh client
ssh client mac hmac-sha1,hmac-sha2-256,hmac-sha2-512
!
device(config)# do show ssh client status
SSH Client Mac: hmac-sha1,hmac-sha2-256,hmac-sha2-512
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ssh server cipher

Sets the SSH server's cipher list for the SSH server.

## Syntax

`ssh server cipher string`

`no ssh server cipher`

## Parameters

*string*

The string name of the cipher. Refer to the device for the available options.

## Modes

Global configuration mode

## Usage Guidelines

Use the `no ssh server cipher` command remove the cipher list from the ssh client.

## Examples

Sets the SSH server's cipher list.

```
device# configure terminal
device(config)# ssh server cipher aes256-ctr
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ssh server cipher non-cbc

Sets the SSH server's cipher list to non-cbc ciphers for the SSH server.

## Syntax

```
ssh server cipher non-cbc
```

```
no ssh server cipher non-cbc
```

## Modes

Global configuration mode

## Usage Guidelines

Use the **no ssh server cipher non-cbc** command remove the non-cbc cipher list from the ssh client.

## Examples

Sets the SSH server's cipher list to non-cbc ciphers.

```
device# configure terminal
device(config)# ssh server cipher non-cbc
device(config)# do show running-config ssh
ssh server non-cbc
ssh client non-cbc
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ssh server key

Generates or zeroizes SSH crypto keys on the device. All three keys can be active simultaneously.

## Syntax

```
ssh server key {dsa | rsa [1024 | 2048] | ecdsa 256}
```

```
no ssh server key {dsa | rsa | ecdsa}
```

## Command Default

The default values of SSH keys are:

- DSA is active
- ECDSA value is 256
- RSA value is 2048

## Parameters

**dsa**

Generates the DSA key.

**rsa [1024 | 2048]**

Generates the RSA key, in either the 1024 or 2048 bit size.

**ecdsa 256**

Generates the ECDSA key at 256 bits.

## Modes

Global configuration mode

## Usage Guidelines

The **no ssh server key** command zeroizes the SSH keys on the device.

If you generate and delete SSH crypto keys, you must restart the SSH server using the **no ssh server shutdown** command to enable the configuration.

## Examples

Typical DSA command example:

```
device(config)# ssh server key dsa
```

Typical RSA command example:

```
device(config)# ssh server key rsa 1024
```

Typical ECDSA command example:

```
device(config)# ssh server key ecdsa 256
```

Typical zeroizing example:

```
device(config)# no ssh server key dsa
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ssh server key-exchange

Specifies the method used for generating the one-time session keys for encryption and authentication with the Secure Shell (SSH) server and Diffie-Hellman group 14.

## Syntax

`ssh server key-exchange string`

`no ssh server key-exchange`

## Parameters

*string*

The string for the name of the algorithm `diffie-hellman-group14-sha1`, or a comma-separated list of supported Key-exchange algorithms; such as `diffie-hellman-group14-sha1,diffie-hellman-group1-sha1`, and so on.

## Command Default

This command is not configured by default.

## Modes

Global configuration mode

## Usage Guidelines

You can configure the SSH server key-exchange method to DH Group 14. When the SSH server key-exchange method is configured to DH Group 14, the SSH connection from a remote SSH client is allowed only if the key-exchange method at the client end is also configured to DH Group 14. Enter **no ssh server key-exchange** to restore SSH server key-exchange to the default value.

For information on DH Group 14, refer to [RFC 3526](#).

For backward compatibility, the string "dh-group-14" is also acceptable in place of "diffie-hellman-group14-sha1"

## Examples

To set SSH server key-exchange to DH Group 14:

```
device(config)# ssh server key-exchange diffie-hellman-group14-sha1
```

To restore the SSH server key-exchange to default value:

```
device(config)# no ssh server key-exchange
```



## History

Release version	Command history
16r.1.00	This command was introduced.

# ssh server mac

Supports MAC configurations for the SSH server.

## Syntax

`ssh server mac string`

`no ssh server mac`

## Parameters

*string*

The string name of the default MAC required. Your choices are hmac-md5, hmac-sha1, hmac-sha2-256, and hmac-sha2-512. The default MACs supported in FIPS mode are hmac-sha1, hmac-sha2-256, and hmac-sha2-512.

## Modes

Global configuration mode

## Usage Guidelines

The MAC hmac-md5 is not supported in FIPS mode.

## Examples

Typical command example:

```
device# configure terminal
device(config)# ssh server mac hmac-sha1,hmac-sha2-256,hmac-sha2-512
device(config)# do show running-config ssh server
ssh server mac hmac-sha1,hmac-sha2-256,hmac-sha2-512
ssh server key rsa 2048
ssh server key ecdsa 256
ssh server key dsa
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ssh server max-sessions

Specifies the maximum number of open Secure Shell (SSH) sessions per SSH network connection.

## Syntax

```
ssh server max-sessions number
```

```
no ssh server max-sessions
```

## Command Default

The default number of sessions is 1 unless it is changed by this command.

## Parameters

*number*

Maximum number of sessions. Range is from 1 through 10.

## Modes

Global configuration mode

## Usage Guidelines

After executing this command, in order to use the new number of sessions, you must first shut down the SSH server, by means of the **ssh server use-vrf shutdown** command, and then restart it, by means of the **no ssh server use-vrf shutdown** command.

The maximum number of sessions specified by this command is synchronized to the standby management module (MM). However, to make the change effective on the standby MM, you must first disable service on that module by means of the **no ssh server standby enable** command, and then reenabling service by means of the **ssh server standby enable** command.

A downgrade to a previous release is blocked if this command has been executed in the running configuration.

Use the **no ssh server max-sessions** command to revert to the default of 1 session. You must also stop and restart service as in the Usage Guidelines above.

## Examples

To change the maximum number of supported SSH sessions from the default to 7, and confirm the configuration:

```
device# configure terminal
device(config)# ssh server max-sessions 7
device(config)# do show running-config ssh server
ssh server max-sessions 7
ssh server key rsa 2048
ssh server key ecdsa 256
ssh server key dsa
```

To revert to the default number of sessions (1):

```
device(config)# no ssh server max-sessions
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ssh server rekey-interval

Configures the Secure Shell (SSH) server rekey-interval.

## Syntax

```
ssh server rekey-interval interval
```

```
no ssh server rekey-interval
```

## Parameters

*interval*

The value for the rekey interval. Range is from 900 to 3600 seconds.

## Modes

Global configuration mode

## Usage Guidelines

Use the **no ssh server rekey-interval** command to remove the rekey-interval.

## History

Release version	Command history
16r.1.00	This command was introduced.

# ssh server shutdown

Disables SSH service.

## Syntax

```
ssh server [ use-vrf vrf-name ] shutdown
```

```
no ssh server [ use-vrf vrf-name ] shutdown
```

## Parameters

**use-vrf** *vrf-name*

Specifies a user-defined VRF, or built-in VRFs such as mgmt-vrf or default-vrf.

## Modes

Global configuration mode

## Usage Guidelines

Enter **no ssh server shutdown** to enable SSH service.

The use of the **use-vrf** keyword brings down the server only for the specified VRF. The user can shut down any server in any VRF, including the management and default VRF.

When this command is executed and a VRF is not specified by means of the **use-vrf** keyword, the server is brought down only in the management VRF ("mgmt-vrf") (the default VRF for this command).

## Examples

To shut down SSH service on the management VRF:

```
device(config)# ssh server shutdown
```

To shut down SSH service for a user-defined VRF:

```
device(config)# ssh server use-vrf myvrf shutdown
```

To enable SSH service on the management VRF:

```
device(config)# no ssh server shutdown
```

To enable SSH service:

```
device(config)# no ssh server shutdown
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ssh server standby enable

Enables the SSH services on the standby MM.

## Syntax

`ssh server standby enable`

`no ssh server standby enable`

## Command Default

The SSH services are disabled on the standby MM.

## Modes

Global configuration mode

## Usage Guidelines

The `no ssh server standby enable` command disables the SSH services on the standby MM.

## Examples

Typical command output:

```
device(config)# no ssh server standby enable
device(config)# do show running-config | include standby
% No entries found.
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ssm-enable

Enables or disables the SSM mode for PIM.

## Syntax

```
ssm-enable range IP prefix list name
```

```
no ssm-enable range IP prefix list name
```

## Parameters

### range

Specifies the range of the SSM map.

### *IP prefix list name*

Specifies the name of the IP prefix list.

## Modes

Router PIM configuration mode

## Usage Guidelines

PIM Source Specific Multicast (SSM) is a subset of the PIM SM protocol. In the PIM SSM mode, the shortest path tree (SPT) is created at the source. The SP is created between the receiver and source, but the SPT is built without the help of the RP. The router closest to the interested receiver host is notified of the unicast IP address of the source for the multicast traffic. PIM SSM goes directly to the source-based distribution tree without the need of the RP connection. PIM SSM is different from PIM SM because it forms its own SP tree, without forming a shared tree.

## Examples

The following example enables SSM and applies the default SSM range - 232.0.0.0/8.

```
device(config)# router pim
device(config-pim-router)# ssm-enable
```

The following example enables SSM and configures an SSM map at the global level.

```
device(config)# ip igmp ssm-map enable
device(config)# ip igmp ssm-map ssm-map-230-to-232 203.0.0.10
device(config)# ip igmp ssm-map ssm-map-233-to-234 204.0.0.10
```

The following example configures the SSM range at the router PIM configuration level.

```
device(config)# router pim
device(config-pim-router)# ssm-enable range PL_ssm_range -230-to-234
```



## History

Release version	Command history
16r.1.00	This command was introduced.

# start (CFM)

Defines the start time for a delay measurement receiver session.

## Syntax

```
start { now | after HH:MM:SS | HH:MM:SS daily }
no start
```

## Command Default

The start time is not defined

## Parameters

### now

The session is initiated immediately.

### after HH:MM:SS

Initiates the one-way delay measurement receiver session after a period of time has elapsed, in hours, minutes, and seconds.

### HH:MM:SS daily

Initiates the one-way delay measurement receiver session at the specified time every day.

## Modes

CFM protocol configuration mode

## Usage Guidelines

The **no start** command deletes the start time.

Relative time is converted to absolute time. Otherwise, the system would not point to the expected time after a reboot.

## Examples

Example of starting the session after one hour and thirty minutes.

```
device(config-cfm-oneway-dm-receiver-1)# start after 01:30:00
```

Example of starting the session daily at 3:30 pm.

```
device(config-cfm-oneway-dm-receiver-1)# start daily 15:30:00
```

## History

Release version	Command history
17r.1.01	This command was introduced.

# start

Configure the start time.

## Syntax

**start at** *hh:mm:ss* **daily**

**start after** *hh:mm:ss* **daily**

**no start**

## Parameters:

*at*

Specifies the time to start at.

*hh:mm:ss*

Specifies the time in hour, minute, and second format.

*after*

Specifies the measurement interval in minutes.

*daily*

Specifies time to start daily.

## Command Default

The default value is start after 00:05:00 (After).

## Modes

Y1731 configuration mode

## Usage Guidelines

Use the **no** form of the command to delete the start configuration.

## Examples

This example shows how to configure the start time.

```
device# configure terminal
device (config-cfm)# protocol cfm
device (config-cfm)# y1731
device(config-cfm-y1731)# test-profile my_test_profile
device(config-cfm-y1731-test-profile-my_test_profile)# type delay-measurement
device(config-cfm-y1731-test-profile-my_test_profile)# tx-interval 60
device(config-cfm-y1731-test-profile-my_test_profile)# measurement-interval 30
device(config-cfm-y1731-test-profile-my_test_profile)# start at 00:00:00 daily
```

start

## History

Release version	Command history
17r.1.01	This command was introduced.

# start-shell

Accesses the SLXVM Linux shell from the SLX-OS CLI.

## Syntax

**start-shell**

## Modes

Privileged EXEC mode

## Usage Guidelines

This command is only available for users with admin-level permissions.

You can also run this command from Global configuration mode: `device (config) # do start-shell`.

Inside the SLXVM Linux shell, you can escalate your privileges to root access, by using the **su root** Linux command. Escalation to root access is password protected.

Inside the SLXVM Linux shell, execution of root privilege commands using **sudo** is not supported.

The idle timeout of Linux shell sessions is five minutes, after which you are automatically logged out of the Linux shell and returned to the SLX-OS CLI.

## Examples

The following example accesses the SLXVM Linux shell from the SLX-OS CLI.

```
device# start-shell
Entering Linux shell for the user: admUser
[admUser@SLX]#
```

The following example escalates access from the default SLXVM Linux shell to root.

```
[admUser@SLX]# su root
Password:
```

```
We trust you have received the usual lecture from the local System
Administrator. It usually boils down to these three things:
```

- #1) Respect the privacy of others.
- #2) Think before you type.
- #3) With great power comes great responsibility.

```
[root@SLX]#
```

In the following example, the Linux `ps -ef` command lists the process status.

```
[admUser@SLX]# ps -ef
UID          PID    PPID  C  STIME TTY          TIME CMD
root           1        0  0   Jul24 ?           00:00:04 /sbin/init
root           2        0  0   Jul24 ?           00:00:00 [kthreadd]
root           3        2  0   Jul24 ?           00:00:00 [migration/0]
root           4        2  0   Jul24 ?           00:00:03 [ksoftirqd/0]
root           5        2  0   Jul24 ?           00:00:00 [migration/1]
root           6        2  0   Jul24 ?           00:00:03 [ksoftirqd/1]
root           7        2  0   Jul24 ?           00:00:00 [migration/2]
root           8        2  0   Jul24 ?           00:00:02 [ksoftirqd/2]
root           9        2  0   Jul24 ?           00:00:00 [migration/3]
root          10        2  0   Jul24 ?           00:00:02 [ksoftirqd/3]
root          11        2  0   Jul24 ?           00:00:00 [migration/4]
root          12        2  0   Jul24 ?           00:00:02 [ksoftirqd/4]
root          13        2  0   Jul24 ?           00:00:00 [migration/5]
root          14        2  0   Jul24 ?           00:00:03 [ksoftirqd/5]
root          27        2  0   Jul24 ?           00:00:00 [cpuset]
root          28        2  0   Jul24 ?           00:00:01 [khelper]
root          31        2  0   Jul24 ?           00:00:00 [netns]
root          34        2  0   Jul24 ?           00:00:00 [async/mgr]
root          270        2  0   Jul24 ?           00:00:00 [sync_supers]
root          272        2  0   Jul24 ?           00:00:00 [bdi-default]

...

root      8kblockd/6]182      1  0   Jul24 ?           00:00:00 /usr/sbin/inetd
root      8237      1  0   Jul24 ?           00:00:00 /usr/sbin/sshd
admin    27536 27535  0 04:19 pts/4           00:00:00 ps -ef
```

The following example exits a root-level user to the SLXVM Linux shell.

```
[root@SLX]# exit
exit
[admUser@SLX]#
```

The following example exits from the SLXVM Linux shell to the SLX-OS CLI.

```
[admUser@SLX]# exit
exit
Exited from Linux shell
device#
```

## History

Release version	Command history
16r.1.00	This command was introduced.
17r.1.00	This command was modified. Inside the Linux shell—by default—an SLX-OS user no longer has root access, but rather limited access.

# static-network

Configures a static BGP4 network, creating a stable network in the core.

## Syntax

```
static-network network/mask [ distance num ]
no static-network network/mask [ distance num ]
```

## Parameters

*network/mask*

Network and mask in CIDR notation.

**distance** *num*

Specifies an administrative distance value for this network. Valid values range from 1 through 255. The default is 200.

## Modes

BGP address-family IPv4 unicast configuration mode

BGP address-family IPv4 unicast VRF configuration mode

## Usage Guidelines

While a route configured with this command will never flap unless it is deleted manually, a static BGP4 network will not interrupt the normal BGP4 decision process on other learned routes that are installed in the Routing Table Manager (RTM). Consequently, when there is a route that can be resolved, it will be installed into the RTM.

## Examples

The following example configures a static network and sets an administrative distance of 300.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv4 unicast
device(config-bgp-ipv4u)# static-network 10.11.12.0/32 distance 300
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# statistics

Enables statistics on the tunnel interface.

## Syntax

**statistics**

**no statistics**

## Command Default

Statistics is disabled on a tunnel interface.

## Modes

Interface tunnel configuration mode

## Usage Guidelines

Use the **no** form of this command to disable statistics on the tunnel interface.

Note that traffic loss might occur when you enable or disable statistics on a tunnel interface.

## Examples

This example enables statistics on the tunnel interface.

```
device# configure terminal
device (config)# interface tunnel 5
device(config-intf-tunnel-5)# statistics
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# statistics (bridge domain)

Enables ingress and egress statistics on a bridge domain.

## Syntax

**statistics**

**no statistics**

## Parameters

None

## Command Default

Statistics are disabled.

## Modes

Bridge-domain configuration mode.

## Usage Guidelines

The **no** form of the command disables statistics on the bridge domain.

## Examples

The following example shows how to enable ingress and egress statistics on bridge domain 2.

```
device# config terminal
device(config)# bridge-domain 2
device(config-bridge-domain-2)# statistics
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# statistics (VLAN)

Enables statistics on a VLAN.

## Syntax

**statistics**

**no statistics**

## Command Default

Statistics are disabled.

## Parameters

None

## Modes

VLAN configuration mode

## Usage Guidelines

The **no** form of the command disables statistics on a VLAN.

## Examples

The following example shows how to enable statistics on VLAN 10.

```
device# config terminal
device(config)# vlan 10
device(config-Vlan-10)# statistics
```

## History

Release version	Command history
16r.1.01	This command was introduced.

# stop (CFM)

Defines the stop time for a delay measurement receiver session.

## Syntax

```
stop { now | after HH:MM:SS | HH:MM:SS daily }
no stop
```

## Command Default

The stop time is not defined

## Parameters

### now

The session is halted immediately.

### after HH:MM:SS

Halts the one-way delay measurement receiver session after a period of time has elapsed, in hours, minutes, and seconds.

### HH:MM:SS daily

Halts the one-way delay measurement receiver session at the specified time every day.

## Modes

CFM protocol configuration mode

## Usage Guidelines

The **no stop** command deletes the stop time.

The one-way delay measurement receiver session should be started before starting the one-way delay measurement Initiator session. Also, the one-way delay measurement Initiator session should be stopped before stopping the one-way delay measurement Receiver session.

Relative time is converted to absolute time. Otherwise, the system would not point to the expected time after a reboot.

## Examples

Example of stopping the session after one hour and thirty minutes.

```
device(config-cfm-oneway-dm-receiver-1)# stop after 01:30:00
```

Example of stopping the session daily at 3:30 pm.

```
device(config-cfm-oneway-dm-receiver-1)# stop daily 15:30:00
```

## History

Release version	Command history
17r.1.01	This command was introduced.

# stop

Configure the stop time.

## Syntax

**stop** [ **at** *hh:mm:ss* | **after** *hh:mm:ss* ]

**no stop**

## Parameters:

*at*

Specifies the time to stop at.

*hh:mm:ss*

Specifies the time in hour, minute, and second format.

*after*

Specifies the time to stop after.

## Command Default

The default value is 01:05:00 (After).

## Modes

Y1731 configuration mode

## Usage Guidelines

Use the **no** form of the command to delete the stop configuration.

## Examples

This example shows how to configure the stop time.

```
device# configure terminal
device (config-cfm)# protocol cfm
device (config-cfm)# y1731
device(config-cfm-y1731)# test-profile my_test_profile
device(config-cfm-y1731-test-profile-my_test_profile)# type delay-measurement
device(config-cfm-y1731-test-profile-my_test_profile)# tx-interval 60
device(config-cfm-y1731-test-profile-my_test_profile)# measurement-interval 30
device(config-cfm-y1731-test-profile-my_test_profile)# start at 00:00:00 daily
device(config-cfm-y1731-test-profile-my_test_profile)# stop at 23:59:00
```

stop

## History

Release version	Command history
17r.1.01	This command was introduced.

# storm-control ingress

Limits ingress traffic on a specified interface.

## Syntax

```
storm-control ingress { broadcast | unknown-unicast | multicast } { limit-bps | limit-percent } rate [ { monitor | shutdown } ]
no storm-control ingress { broadcast | unknown-unicast | multicast } { limit-bps | limit-percent } rate [ { monitor | shutdown } ]
```

## Parameters

### broadcast

Specifies that the command will operate on broadcast traffic only.

### unknown-unicast

Specifies that the command will operate on unknown-unicast traffic only.

### multicast

Specifies that the command will operate on multicast traffic only.

### limit-bps

Specifies that the value given to the *rate* parameter is in bits per second. If the traffic on the interface reaches this rate, no more traffic (for the traffic type specified) is allowed on the interface.

### limit-percent

Specifies that the value given to the *rate* parameter is in percentage of capacity of the interface. If the traffic on the interface reaches this percentage of capacity, no more traffic (for the traffic type specified) is allowed on the interface.

### rate

Specifies the amount of traffic allowed, either in bits per second or a percentage of the capacity of the interface, depending on which parameter was chosen with the rate.

- Range if you are specifying rate in bps: 0 to 10000000000. Because each application-specific integrated circuit (ASIC) may support different bit granularity, bit rates are rounded up to the next achievable rate.
- Range if you are specifying rate in percent of interface capacity: 0 to 100.

### monitor

Specifies that, if a rate limit is reached within a five-second sampling period, a log message gets sent. A log message is generated upon the first occurrence of such an event. Subsequent log messages are generated only at the end of one complete sample interval in which no rate limits are reached.

### shutdown

Specifies that, if a rate limit is exceeded within a five-second sampling period, the interface will be shut down. You must manually re-enable the interface after a shutdown.

## Modes

Interface configuration mode

## Usage Guidelines

This command limits the amount of broadcast, unknown unicast, and multicast (BUM) ingress traffic on a specified interface. The *shutdown* parameter monitors the status of the configured rate limit every five seconds, and if the maximum defined rate is exceeded the corresponding interface is shut down until you re-enable it using the **no shut** command.

If you want to modify an active BUM storm control configuration, you must first disable it, then issue the **storm-control ingress** command again with the new parameters.

Enter **no storm-control ingress** to disable BUM storm control for a particular traffic type on an interface.

## Examples

To configure storm control on an Ethernet interface, with a rate limited to 1000000 bps:

```
device(config)# interface ethernet 1/2
device(conf-if-eth-1/2)# storm-control ingress broadcast 1000000
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# subnet

Specifies the local IP address with the subnet mask of the routing device.

## Syntax

```
subnet { subnet_addr }
no subnet { subnet_addr }
```

## Command Default

The command is disabled, by default.

## Parameters

*subnet\_addr*  
Specifies the subnet mask of the IP address.

## Modes

MPLS CSPF-group configuration mode.

## Usage Guidelines

When the command is configured, every link in the subnet is penalized.

The **no** form of the command disables the command.

## Examples

The following example configures subnet *10.1.2.0* with a mask length of *24*.

```
device# configure
device(config)# router mpls
device(config-router-mpls)# cspf-group group3
device(config-router-mpls-cspf-group-group3)# subnet 10.1.2.0/24
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# summary-address (IS-IS)

Configures route summarization to aggregate Intermediate System-to-Intermediate System (IS-IS) route information.

## Syntax

```
summary-address ip-address subnet-mask level-1 [ level-2 ]
summary-address ip-address subnet-mask level-2 [ level-1 ]
no summary-address ip-address subnet-mask level-1 [ level-2 ]
no summary-address ip-address subnet-mask level-2 [ level-1 ]
```

## Command Default

Disabled.

## Parameters

*ip-address*

Specifies an IP address.

*subnet-mask*

Specifies a subnet mask.

**level-1**

Specifies that only routes redistributed into Level 1 are summarized with the configured address and mask value.

**level-2**

Specifies that only routes redistributed into Level 2 are summarized with the configured address and mask value.

## Modes

IS-IS address-family IPv4 unicast configuration mode

## Usage Guidelines

Route Summarization using this command is applicable only for redistributed routes.

The **no** form of the command disables route summarization.

## Examples

The following example configures a summary address of 10.1.0.0 with a mask of 255.255.0.0 for Level 1 redistributed routes.

```
device# configure terminal
device(config)# router isis
device(config-isis-router)# address-family ipv4 unicast
device(config-router-isis-ipv4u)# summary-address 10.1.0.0 255.255.0.0 level-1
```

The following example configures a summary address of 10.1.0.0 with a mask of 255.255.0.0 for Level 2 redistributed routes.

```
device# configure terminal
device(config)# router isis
device(config-isis-router)# address-family ipv4 unicast
device(config-router-isis-ipv4u)# summary-address 10.1.0.0 255.255.0.0 level-2
```

The following example configures a summary address of 10.1.0.0 with a mask of 255.255.0.0 for Level 1 and Level 2 redistributed routes.

```
device# configure terminal
device(config)# router isis
device(config-isis-router)# address-family ipv4 unicast
device(config-router-isis-ipv4u)# summary-address 10.1.0.0 255.255.0.0 level-1 level-2
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# summary-address (OSPFv2)

Configures route summarization for redistributed routes for an Autonomous System Boundary Router (ASBR).

## Syntax

```
summary-address A.B.C.D E.F.G.H  
no summary-address
```

## Command Default

Summary addresses are not configured.

## Parameters

*A.B.C.D E.F.G.H*  
IP address and mask for the summary route representing all the redistributed routes in dotted decimal format.

## Modes

OSPF router configuration mode  
OSPF VRF router configuration mode

## Usage Guidelines

Use this command to configure an ASBR to advertise one external route as an aggregate for all redistributed routes that are covered by a specified address range. When you configure an address range, the range takes effect immediately. All the imported routes are summarized according to the configured address range. Imported routes that have already been advertised and that fall within the range are flushed out of the AS and a single route corresponding to the range is advertised.

If a route that falls within a configured address range is imported by the device, no action is taken if the device has already advertised the aggregate route; otherwise the device advertises the aggregate route. If an imported route that falls within a configured address range is removed by the device, no action is taken if there are other imported routes that fall within the same address range; otherwise the aggregate route is flushed.

The device sets the forwarding address of the aggregate route to 0 and sets the tag to 0. If you delete an address range, the advertised aggregate route is flushed and all imported routes that fall within the range are advertised individually. If an external link-state-database-overflow condition occurs, all aggregate routes and other external routes are flushed out of the AS. When the device exits the external LSDB overflow condition, all the imported routes are summarized according to the configured address ranges. This parameter affects only imported, type 5 external routes.

The no form of the command disables route summarization.

## Examples

The following example configures a summary address of 10.1.0.0 with a mask of 10.255.0.0. Summary address 10.1.0.0, includes addresses 10.1.1.0, 10.1.2.0, 10.1.3.0, and so on. For all of these networks, only the address 10.1.0.0 is advertised in external LSAs:

```
device# configure terminal
device(config)# router ospf
device(config-router-ospf-vrf-default-vrf)# summary-address 10.1.0.0 10.255.0.0
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# summary-address (OSPFv3)

Configures route summarization for redistributed routes for an Autonomous System Boundary Router (ASBR).

## Syntax

```
summary-address IPv6-addr/mask  
no summary-address
```

## Command Default

Summary addresses are not configured.

## Parameters

*A:B:C:D/LEN*

IPv6 address and mask for the summary route representing all the redistributed routes in dotted decimal format.

## Modes

OSPFv3 router configuration mode  
OSPFv3 VRF router configuration mode

## Usage Guidelines

Use this command to configure an ASBR to advertise one external route as an aggregate for all redistributed routes that are covered by a specified IPv6 address range. When you configure an address range, the range takes effect immediately. All the imported routes are summarized according to the configured address range. Imported routes that have already been advertised and that fall within the range are flushed out of the AS and a single route corresponding to the range is advertised.

If a route that falls within a configured address range is imported by the device, no action is taken if the device has already advertised the aggregate route; otherwise the device advertises the aggregate route. If an imported route that falls within a configured address range is removed by the device, no action is taken if there are other imported routes that fall within the same address range; otherwise the aggregate route is flushed.

The device sets the forwarding address of the aggregate route to 0 and sets the tag to 0. If you delete an address range, the advertised aggregate route is flushed and all imported routes that fall within the range are advertised individually. If an external link-state-database-overflow condition occurs, all aggregate routes and other external routes are flushed out of the AS. When the device exits the external LSDB overflow condition, all the imported routes are summarized according to the configured address ranges.

## Examples

The following example configures a summary address of 2001:db8::/24 for routes redistributed into OSPFv3. The summary prefix 2001:db8::/24 includes addresses 2001:db8::/1 through 2001:db8::/24. Only the address 2001:db8::/24 is advertised in an external link-state advertisement.

```
device# configure terminal
device(config)# ipv6 router ospf
device(config-ipv6-router-ospf-vrf-default-vrf)# summary-address 2001:db8::/24
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# summary-prefix

Configures summary prefixes to aggregate IPv6 Intermediate System-to-Intermediate System (IS-IS) route information.

## Syntax

```
summary-prefix ipv6-prefix prefix-length { level-1 | level-2 }
```

```
no summary-prefix ipv6-prefix prefix-length { level-1 | level-2 }
```

## Command Default

Disabled.

## Parameters

*ipv6-prefix prefix-length*

Specifies the aggregate address. You must specify the *ipv6-prefix* parameter in hexadecimal using 16-bit values between colons as documented in RFC 2373. You must specify the *prefix-length* parameter as a decimal value. A slash mark (/) must follow the *ipv6-prefix* parameter and precede the *prefix-length* parameter.

**level-1**

Specifies that only routes redistributed into Level 1 are summarized

**level-2**

Specifies that only routes redistributed into Level 2 are summarized.

## Modes

IS-IS address-family IPv6 unicast configuration mode

## Usage Guidelines

Route Summarization using this command is applicable only for redistributed routes.

The **no** form of the command disables route summarization.

## Examples

The following example configures a summary prefix of 2001:db8::/32 to be advertised to Level 1 redistributed routes only.

```
device# configure terminal
device(config)# router isis
device(config-isis-router)# address-family ipv4 unicast
device(config-router-isis-ipv4u)# summary-prefix 2001:db8::/32 level-1
```

The following example configures a summary prefix of 2001:db8::/32 to be advertised to Level 2 redistributed routes only.

```
device# configure terminal
device(config)# router isis
device(config-isis-router)# address-family ipv4 unicast
device(config-router-isis-ipv4u)# summary-prefix 2001:db8::/32 level-2
```



## History

Release version	Command history
16r.1.00	This command was introduced.

# support autoupload-param

Defines autoupload parameters.

## Syntax

```
support autoupload-param hostip hostip | user user_acct | password password [ protocol [ ftp | scp | sftp ] ] directory path
```

## Parameters

**hostip** *host-ip*

Specifies the IP address of the remote host.

**user** *user\_acct*

Specifies the user name to access the remote host.

**password** *password*

Specifies the password to access the remote host.

**protocol** *FTP|SCP|SFTP*

Specifies the protocol used to access the remote server.

**directory** *path*

Specifies the path to the directory.

**rbridge-id**

Enables RBridge ID mode to support Virtual Cluster Switching (VCS) on individual nodes.

*rbridge-id*

Specifies a unique identifier for a node.

**all**

Specifies all identifiers for a node.

## Modes

Global configuration mode.

## Examples

```
switch(config)# support autoupload-param hostip 10.31.2.27 protocol [ ftp | scp | sftp ] username hegdes
directory /uers/home40/hegdes/autoupload password
```

```
(<string>): *****
```

## History

Release version	Command history
17r.1.01	This command was introduced.
	This command was modified to...

# switch-attributes

Configures the chassis or host name for the device.

## Syntax

```
switch-attributes { chassis-name chassis-name } | { host-name host-name }  
switch-attributes { chassis-name | host-name }
```

## Command Default

The default chassis name is SLX9850-# where # is the number of slots in the chassis.

The default host name is SLX.

## Parameters

**chassis-name** *chassis-name*

Specifies the chassis name. A chassis name can be from 1 through 30 characters long, must begin with a letter, and can contain letters, numbers, and underscore characters.

**host-name** *host-name*

Specifies the host name and changes the CLI prompt. A host name can be from 1 through 30 characters long. It must begin with a letter, and can contain letters, numbers, and underscore characters.

## Modes

Global configuration mode

## Usage Guidelines

Use the **no** form of the command to reset the default settings.

Extreme Networks recommends that you customize the chassis name for each device. Some system logs identify the device by its chassis name; if you assign a meaningful chassis name, logs are more useful.

## Examples

The following example configures the chassis and host names.

```
device# configure terminal  
device(config)# switch-attributes chassis-name SLX-market1  
device(config)# switch-attributes host-name SLX-mrkt  
SLX-mrkt(config)#
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# switchport

Puts the interface in Layer 2 mode and sets the switching characteristics of the Layer 2 interface.

## Syntax

```
switchport
no switchport
```

## Command Default

All Layer 2 interfaces are mapped to default VLAN 1 and the interface is set to access mode.

## Modes

Interface subtype configuration mode

## Usage Guidelines

For changing the interface configuration mode to trunk or changing the default VLAN mapping, use additional **switchport** commands.

To redefine the switch from Layer 2 mode into Layer 3 mode, enter **no switchport**.

## Examples

To put a specific Ethernet interface in Layer 2 mode:

```
device# configure terminal
switch(config)# interface ethernet 1/9
switch(conf-if-eth-1/9)# switchport
```

To remove a specific port-channel interface from Layer 2 mode:

```
device# configure terminal
switch(config)# interface port-channel 44
switch(config-Port-channel-44)# no switchport
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# switchport access

Sets the Layer 2 interface as access.

## Syntax

```
switchport access { vlan vlan_id | rspan-vlan vlan_id | mac HHHH.HHHH.HHHH | mac-group mac-group-id }
no switchport access { vlan vlan_id | rspan-vlan vlan_id | mac HHHH.HHHH.HHHH | mac-group mac-group-id }
```

## Command Default

All Layer 2 interfaces are in access mode and belong to the VLAN ID 1.

## Parameters

**vlan** *vlan\_id*

Sets the port VLAN (PVID) to the specified *vlan\_id*. Range is below 4096 for 802.1Q VLANs, and from 4096 through 8191 for service or transport VFs in a Virtual Fabrics context.

**rspan-vlan** *vlan\_id*

Sets a VLAN ID for RSPAN (Remote Switched Port Analyzer) traffic analysis.

**mac** *HHHH.HHHH.HHHH*

Sets a source MAC address for classifying an untagged VLAN specified by the **vlan** keyword.

**mac-group** *mac-group-id*

(Optional) Specifies a set of MAC addresses. The group of addresses must be established by the global **mac-group** command.

## Modes

Interface subtype configuration mode on edge ports

## Usage Guidelines

In access mode, the interface only allows untagged and priority tagged packets.

In a Virtual Fabrics context, use this command also to configure service or transport VFs on an access port. This allows multiple untagged VLANs on the port by means of SRC MAC classifiers.

Enter **no switchport access vlan** to set the PVID to the default VLAN 1.

## Examples

To set the Layer 2 interface PVID to 100 on a specific Ethernet interface:

```
device# configure terminal
switch(config)# interface ethernet 1/9
switch(conf-if-eth-1/9)# switchport access vlan 100
```

To set the PVID to the default VLAN 1 on a specific port-channel interface:

```
device# configure terminal
switch(config)# interface port-channel 44
switch(config-Port-channel-44)# no switchport access vlan
```

The following examples illustrate configuration with service or transport VFs in a Virtual Fabrics context.

In global configuration mode, establish a mac-group:

```
device# configure terminal
switch(config)# mac-group 1
switch(config-mac-group 1)# mac 0002.0002.0002
switch(config-mac-group 1)# mac 0005.0005.0005
switch(config-mac-group 1)# mac 0008.0008.0008
```

In interface configuration mode, ensure that the switchport mode is set to access:

```
device# configure terminal
switch(config)# interface ethernet 1/1
switch(config-if-eth-1/1)# switchport mode access
```

Set the default access VLAN (the default is 1) to 5000 (a classified VLAN):

```
device# configure terminal
switch(config)# interface ethernet 1/1
switch(config-if-eth-0/1)# switchport access vlan 5000
```

Classify an 802.1Q VLAN by means of a source MAC address:

```
device# configure terminal
switch(config)# interface ethernet 1/1
switch(config-if-eth-1/1)# switchport access vlan 200 mac 0002.0002.0002
```

Configure a classified VLAN (> 4095) on the same interface with a MAC address. Frames that do not match the source MAC addresses of 0002.0002.0002 or 0004.0004.0004 are classified into VLAN 5000 (the access VLAN for all untagged frames that do not have MAC address classifications).

```
device# configure terminal
switch(config)# interface ethernet 1/1
switch(config-if-eth-1/1)# switchport access vlan 6000 mac 0004.0004.0004
```

The following errors occur because a MAC address can be classified to only one VLAN on the same interface.

```
device# configure terminal
switch(config)# interface ethernet 0/1
switch(config-if-eth-1/1)# switchport access vlan 7000 mac-group 1
switch(config-if-eth-1/1)# %Error: Mac-address/Mac-group is overlapping with another Mac-address/Mac-group configuration on the same port.
switch(config-if-eth-1/1)# switchport mode access
switch(config-if-eth-1/1)# switchport access vlan 7000 mac-group 1
switch(config-if-eth-1/1)# switchport access vlan mac 8000 0008.0008.0008
switch(config-if-eth-1/1)# %Error: Mac-address/Mac-group is overlapping with another Mac-address/Mac-group configuration on the same port.
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# switchport mode

Sets the mode of the Layer 2 interface.

## Syntax

```
switchport mode { access | trunk }
```

## Parameters

### access

Sets the Layer 2 interface as access. Access mode assigns the port to a VLAN

### trunk

Sets the Layer 2 interface as trunk. Trunk mode makes the port linkable to other switches and routers

## Modes

Interface subtype configuration mode

## Usage Guidelines

You must configure the same native VLAN on both ends of an 802.1 or classified VLAN trunk link. Failure to do so can cause bridging loops and VLAN leaks.

## Examples

To set the mode of a specific Ethernet interface to *access* :

```
device# configure terminal
switch(config)# interface ethernet 1/9
switch(config-if-eth-1/9)# switchport mode access
```

To set the mode of a specific port-channel interface to *trunk*:

```
device# configure terminal
switch(config)# interface port-channel 44
switch(config-Port-channel-44)# switchport mode trunk
```

## History

Release version	Command history
17r.1.00	This command was introduced.



# switchport mode trunk-no-default-native

Configures a port to trunk mode without the native vlan.

## Syntax

```
switchport mode trunk-no-default-native
```

## Modes

Interface configuration mode

## Usage Guidelines

By assigning this mode, you can configure an untagged logical interface on the specified port. The device discards any ingress tagged or untagged packet until a switchport classification or native VLAN classification is configured.

To disable this functionality, issue the **no switchport** command, or enter a different switchport mode by using the **switchport mode access** command or the **switchport mode trunk** command.

Before you change the switch port mode from **switchport mode access** with an explicit **switchport access vlan** to **switchport mode trunk-no-default-native**, you must enter the **no switchport** command on the interface level, and then enter the **switchport** command to set the interface as a switchport. Now you can configure the **switchport mode trunk-no-default-native** command.

Port mode change is not allowed when port security is enabled on the interface.

This is the fundamental difference between this command and the **switch mode trunk** command, which implicitly creates VLAN 1 on the port.

The global command **dot1q tag native-vlan** does not affect the ingress or egress tagging behavior of the native VLAN configured in this mode.

The following native VLAN commands that are supported in regular trunk mode are NOT supported in this mode:

- **switchport trunk tag native-vlan**
- **switchport trunk native-vlan**

## Examples

The following example configures a trunk port without a default native VLAN, then explicitly configures the native VLAN.

```
device# configure terminal
device(config)# interface ethernet 0/1
device(config-if-eth-0/1)# switchport mode trunk-no-default-native
device(config-if-eth-0/1)# switchport trunk tagged
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# switchport port-security

Enables port security on an interface port.

## Syntax

**switchport port-security**

**no switchport port-security**

## Command Default

Port security is not enabled.

## Modes

Interface configuration mode

## Usage Guidelines

Port mode change is not allowed when port security is enabled on the interface.

The **no switchport port-security** command disables port security on the interface.

## Examples

The following example enables port MAC security on an interface:

```
device(config)# interface Ethernet 3/2
device(conf-if-eth-3/2)# switchport
device(conf-if-eth-3/2)# switchport port-security
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# switchport port-security mac-address

Configures the MAC address option for port security on an interface port.

## Syntax

```
switchport port-security mac-address address vlan vlan_id
```

## Command Default

MAC address is not configured for port security.

## Parameters

**mac-address** *address*

Specifies the MAC address-based VLAN classifier rule used to map to a specific VLAN.

**vlan** *vlan\_id*

Specifies a VLAN.

## Modes

Interface configuration mode

## Usage Guidelines

Static MAC addresses cannot be configured on a secure port. They must be configured as secure MAC addresses on the secure port.

When static MAC address is configured on an access secure port, the MACs qualify for access VLANs, but on trunk port, VLAN must be specified.

The **no switchport port-security mac-address** command removes the specified MAC address.

## Examples

The following example configures static MAC address for port security on an interface:

```
device(config)# interface Ethernet 3/2
device(conf-if-eth-3/2)# switchport
device(conf-if-eth-3/2)# switchport port-security mac-address 0000.00eb.2d14 vlan 2
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# switchport port-security max

Configures the maximum number of MAC addresses used for port MAC security on an interface port.

## Syntax

```
switchport port-security max value
no switchport port-security max
```

## Parameters

*value*

The maximum number of secure MAC addresses. Range is from 1 through 8192.

## Command Default

The default value is 8192 MAC addresses.

## Modes

Interface configuration mode

## Usage Guidelines

The maximum MAC address limit for sticky MAC address and static MAC address depends on the device limit. For dynamically learned MAC addresses, the maximum limit is 8192 per port.

The **no switchport port-security max** command restores the default value of maximum number of MAC addresses.

## Examples

The following example configures the maximum number of MAC addresses used for port MAC security on an interface port as 10:

```
device(config)# interface Ethernet 3/2
device(conf-if-eth-3/2)# switchport
device(conf-if-eth-3/2)# switchport port-security max 10
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# switchport port-security shutdown-time

Configures the auto recovery time for ports that shuts down following a port security violation on an interface.

## Syntax

```
switchport port-security shutdown-time time
```

## Command Default

Auto recovery of ports is not enabled.

## Parameters

*time*

The amount of time in minutes, the port waits before it recovers from forced port shutdown. Range is from 1 through 15.

## Modes

Interface configuration mode

## Usage Guidelines

The shutdown and no-shutdown processes initiated as part of the port violation action is independent of the shutdown process explicitly initiated by an administrator on the same port on which port MAC security is enabled.

If a port security-based change occurs when a port is shut down, the shutdown timer is not triggered. Consequently, the user must restore the full functionality of the port.

When port security violation causes a port to be shut down and the user manually changes the shutdown time, the shutdown timer is reset and the timer starts with the new shutdown time.

The **no switchport port-security shutdown-time** command disables the auto recovery functionality.

## Examples

The following example configures the auto recovery time as 4 minutes for ports that shuts down following a port security violation on an interface.

```
device(config)# interface Ethernet 3/2
device(conf-if-eth-3/2)# switchport
device(conf-if-eth-3/2)# switchport port-security shutdown-time 4
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# switchport port-security sticky

Enables sticky MAC learning on the port to convert the dynamically learned MAC addresses to sticky secure MAC addresses.

## Syntax

```
switchport port-security sticky [ mac-address address vlan vlan_id ]
```

```
no switchport port-security sticky [ mac-address address vlan vlan_id ]
```

## Command Default

Sticky MAC learning on the port is not enabled.

## Parameters

**mac-address** *address*

Specifies the MAC address-based VLAN classifier rule used to map to a specific VLAN.

**vlan** *vlan\_id*

Specifies a VLAN.

## Modes

Interface configuration mode

## Usage Guidelines

When sticky MAC learning is enabled on a secured port, the interface converts all the dynamic secure MAC addresses, including those that were dynamically learned before sticky learning was enabled, to sticky secure MAC addresses. All the subsequent sets of dynamically learned MAC addresses will also be converted to sticky secure MAC addresses.

The **no switchport port-security sticky** disables sticky MAC learning on a secure port, and all the sticky MAC addresses will be converted back to dynamically learned MAC addresses.

Sticky MAC addresses persist even if the port goes down or if the device reboots.

## Examples

The following example enables sticky MAC learning on the port and configures port security with sticky MAC address:

```
device(config)# interface Ethernet 3/2
device(conf-if-eth-3/2)# switchport
device(conf-if-eth-3/2)# switchport port-security sticky
device(conf-if-eth-3/2)# switchport port-security sticky mac-address 0000.0018.747C vlan 5
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# switchport port-security violation

Configures the violation response action for port security on an interface.

## Syntax

```
switchport port-security violation shutdown
```

## Command Default

The port shuts down if port security violation occurs.

## Parameters

**shutdown**

Puts the interface into the error-disabled state.

## Modes

Interface configuration mode

## Usage Guidelines

If a MAC address already learned on a secured port ingresses on a non-secured port or through another secured port, it is not considered security violation. In this scenario, MAC movement happens if it is a dynamically learned MAC address. If it is a static MAC address or sticky MAC address, MAC movement does not happen, but the traffic is switched (flooded or forwarded) based on the destination MAC address.

If the port shuts down after security violation, an administrator can explicitly bring up the interface or a shutdown timer can be configured using the **switchport port-security shutdown-time** command. After the configured shutdown time, the interface automatically comes up and the port security configuration remains configured on the port.

When the device reboots after port shutdown due to security violation, the ports come up in the shutdown state.

## Examples

The following example configures the violation response action as shutdown for port security on an interface:

```
device(config)# interface Ethernet 3/2
device(conf-if-eth-3/2)# switchport
device(conf-if-eth-3/2)# switchport port-security violation shutdown
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# switchport trunk allowed

Adds or removes VLANs on a Layer 2 interface in trunk mode.

## Syntax

```
switchport trunk allowed { vlan | rspan-vlan } { add vlan_id { ctag { id | ctag - range } | all | except vlan_id | none | remove
vlan_id }
```

## Parameters

### add *vlan\_id*

Adds a VLAN to transmit and receive through the Layer 2 interface. The VLAN can be an 802.1Q VLAN, an RSPAN VLAN, or a transport VLAN.

### all

Allows only 802.1Q VLANs to transmit and receive through the Layer 2 interface. This keyword does not apply to classified or transport VLANs.

### ctag

Specifies an incoming C-TAG or range of C-TAGs for classified or transport VLANs.

*id*

C-TAG ID.

*range*

Range of C-TAG IDs, for example, 100-200, or 10,20,100-200, applicable only if the VLAN is a transport VLAN.

### except *vlan\_id*

Allows only 802.1Q VLANs except the specified VLAN ID to transmit and receive through the Layer 2 interface.

### none

Allows only 802.1Q VLANs to transmit and receive through the Layer 2 interface. This keyword does not apply to service or transport VFs.

### rspan-vlan *vlan\_id*

Selects a VLAN for Remote Switched Port Analyzer (RSPAN) traffic monitoring.

### remove *vlan\_id*

Removes a VLAN that transmits and receives through the Layer 2 interface.

## Modes

Interface subtype configuration mode

## Usage Guidelines

A transport VF C-TAG can be any VLAN ID that is not used in other classifications or as a 802.1Q VLAN.



## Examples

To add the tagged VLAN 100 to a specific Ethernet interface:

```
device# configure terminal
switch(config)# interface ethernet 0/9
switch(config-if-eth-0/9)# switchport trunk allowed vlan add 100
```

To remove the tagged VLAN 100 from the interface:

```
device# configure terminal
switch(config)# interface ethernet 0/9
switch(config-if-eth-0/9)# switchport trunk allowed vlan remove 100
```

Configure a classified VLAN with a C-TAG:

```
device# configure terminal
switch(config)# interface ethernet 0/1
switch(config-if-eth-0/1)# switchport trunk allowed vlan add 5000 ctag 100
switch(config-if-eth-0/1)# switchport trunk allowed vlan add 6000 ctag 200
```

An 802.1Q vlan specified as a user VLAN cannot be used as a C-TAG in a classified VLAN. The following show conflicts.

- Edge C-TAG 100 is already assigned to VLAN 5000 at the same port:

```
device# configure terminal
switch(config)# interface ethernet 0/1
switch(config-if-eth-0/1)# switchport trunk allowed vlan add 8000 ctag 100
switch(config-if-eth-0/1)# %Error: C-tag is already used.
```

- Edge VLAN 888 was already used in 802.1Q configuration.

```
device# configure terminal
switch(config)# interface ethernet 0/1
switch(config-if-eth-0/1)# switchport trunk allowed vlan add 8000 ctag 888
switch(config-if-eth-0/1)# %Error: Ctag is configured in the allowed range on this port.
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# switchport trunk native-vlan-untagged

Configures a port to accept only untagged packets, and specifies that those packets be egress untagged. The untagged packets may be classified to an 802.1Q VLAN, a service VF, or a transport VF.

## Syntax

```
switchport trunk native-vlan-untagged vlan_id
```

```
no switchport trunk native-vlan-untagged
```

## Parameters

*vlan\_id*

Adds a classified VLAN (VLAN ID > 4095) to transmit and receive through the Layer 2 interface.

## Modes

Interface subtype configuration mode on a trunk port

## Usage Guidelines

This command is supported when the port is in no-default-vlan trunk mode, as enabled by means of the **switchport mode trunk-no-default-native** command.

Use the **no switchport trunk native-vlan-untagged** command to remove the configuration.

Port mode change is not allowed when port security is enabled on the interface.

## Examples

Configure untagged native VLAN 5000, allow VLAN 6000, and make VLAN 7000 the default VLAN.

```
device# configure terminal
device(config)# interface ethernet 0/1
device(config-if-eth-0/1)# switchport mode trunk-no-default-native
device(config-if-eth-0/1)# switchport trunk native-vlan untagged 5000
device(config-if-eth-0/1)# switchport trunk add vlan 6000 ctag 100-200
device(config-if-eth-0/1)# switchport trunk default-vlan 7000
```

Remove the native VLAN 5000.

```
device# configure terminal
device(config)# interface ethernet 0/1
device(config-if-eth-0/1)# no switchport trunk native-vlan-untagged
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# switchport trunk native-vlan-xtagged

Configures a port to accept both tagged and untagged packets, and specifies the egress tagging behavior.

## Syntax

```
switchport trunk native-vlan-xtagged vlan_id [ ctag cvid ] egress { tagged | untagged | any }
no switchport trunk native-vlan-xtagged
```

## Parameters

*vlan\_id*

Adds a classified VLAN (VLAN ID > 4095) to transmit and receive through the Layer 2 interface.

**ctag** *cvid*

Sets an optional C-TAG (802.1Q VLAN ID) for a service or transport VF (VLAN ID > 4095).

**egress**

Enables the selection of required tagging options.

**tagged**

Specifies packets as tagged.

**untagged**

Specifies packets as untagged.

**any**

Specifies that packets preserve their ingress encapsulation.

## Modes

Interface subtype configuration mode on a trunk port

## Usage Guidelines

This command is supported when the port is in no-default-vlan trunk mode, as enabled by means of the **switchport mode trunk-no-default-native** command.

Note the following:

- Ingress packets may be classified to an 802.1Q VLAN, a service VF, or a transport VF.
- The native VLAN must accept tagged frames for the **ctag** keyword to apply.
- If the specified VLAN is an 802.1Q VLAN, the **ctag** option is not required.
- If the specified VLAN is an 802.1Q VLAN or a service VF, the **egress** tagging options are **tagged** or **untagged**.
- If the specified VLAN is a transport VF, then the **egress** tagging option must be **any** to preserve the encapsulation of ingress frames.

Use the **no switchport trunk native-vlan-xtagged** command to remove the configuration.

Port mode change is not allowed when port security is enabled on the interface.

## Examples

Configure transport VF 6000 that accepts C-TAG range 100 through 200 and a native VLAN that can be either tagged or untagged.

```
device# configure terminal
device(config)# interface ethernet 0/1
device(config-if-eth-0/1)# switchport mode trunk-no-default-native
device(config-if-eth-0/1)# switchport trunk native-vlan-xtagged 6000 ctag 10 egress any
device(config-if-eth-0/1)# switchport trunk allow vlan 6000 ctag 100-200
```

Remove the native VLAN from the transport VF.

```
device# configure terminal
device(config)# interface ethernet 0/1
device(config-if-eth-0/1)# no switchport trunk native-vlan-xtagged
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# switchport trunk tag native-vlan

Enables tagging on native VLAN traffic.

## Syntax

`switchport trunk tag native-vlan`

`no switchport trunk tag native`

## Modes

Interface subtype configuration mode

## Usage Guidelines

Enter `no switchport trunk tag native` to untag native traffic for a specific interface.

## Examples

To enable tagging for native traffic on a specific Ethernet interface:

```
device# configure terminal
switch(config)# interface ethernet 0/9
switch(config-if-eth-0/9)# switchport trunk tag native-vlan
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# sync-interval

Configures the interval between Precision Time Protocol (PTP) synchronization (Sync) messages on an interface.

## Syntax

`sync-interval seconds`

`no sync-interval`

## Command Default

See Parameters.

## Parameters

*seconds*

Interval between PTP Synch messages, in log seconds. Range is -4 through 2. The default is -1 (2 packets/second). See the Usage Guidelines. Range is -4 through 2. The default is -1 (2 packets/second).

## Modes

PTP configuration mode

Interface subtype configuration mode

## Usage Guidelines

The inputs for **interval** represent base 2 exponents, where the packet rate is  $1/(2^{\log \text{seconds}})$ .

Configuring this interval on an edge port overrides the switch (global) default.

### ATTENTION

Do not configure a rate slower than the default on links between SLX devices.

Use the **no** form of this command to revert to the default.

## Examples

To configure a PTP Sync interval of 2 on an Ethernet interface:

```
device# configure terminal
device(config)# interface ethernet 0/1
device(conf-if-eth-0/1)# protocol ptp
device(conf-if-eth-0/1-ptp)# sync-interval 2
```

To revert to the default PTP Sync interval of -1:

```
device# configure terminal
device(config)# interface ethernet 0/1
device(conf-if-eth-0/1)# protocol ptp
device(conf-if-eth-0/1-ptp)# no sync-interval
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# sysmon fe-access-check

Configures system error monitoring.

## Syntax

```
sysmon fe-access-check [ action | disable | poll-interval | recovery-threshold | threshold]
```

## Parameters

*action*

Sets Fe-Access-Check action.

*disable*

Disables the Fe Access Check.

*poll-interval*

sets the Fe-Access-Check poll-interval.

*recovery-threshold*

Sets the Fe-Access-Check recovery threshold.

*threshold*

sets the Fe-Access-Check threshold.

## Modes

Global configuration mode

## Usage Guidelines

By default, the Fe access check is disabled. The default recovery threshold is 1 and the default threshold is 3. The default action is log, which logs the FE access errors.



## Examples

```

device(config)# sysmon fe-access-check ?
Possible completions:
  action          Set Fe-Access-Check action
  disable         Disable Fe Access Check (Default: Enabled)
  poll-interval   Set Fe-Access-Check poll-interval
  recovery-threshold Set Fe-Access-Check recovery threshold
  threshold       Set Fe-Access-Check threshold
device(config)# sysmon fe-access-check recovery-threshold ?
Possible completions:
  <1-3>   Default: 1
device(config)# sysmon fe-access-check recovery-threshold 2
device(config)# sysmon fe-access-check threshold?
Possible completions:
  threshold Set Fe-Access-Check threshold
device(config)# sysmon fe-access-check threshold ?
Possible completions:
  <1-10>   Default: 3
device(config)# sysmon fe-access-check threshold 5
device(config)# sysmon fe-access-check action ?
Possible completions:
  log      Log FE access error (Default action)
  recover  Recover FE
device(config)# sysmon fe-access-check action log ?
Possible completions:
  <cr>
device(config)# sysmon fe-access-check action log?
Possible completions:
  log Log FE access error (Default action)
device(config)# sysmon fe-access-check recover ?
Possible completions:
  <1-3>   Default is 1
device(config)# sysmon fe-access-check recover 2

```

## History

Release version	Command history
16r.1.00	This command was introduced.

# sysmon sfm-walk

Enables SFM walk.

## Syntax

```
sysmon sfm-walk [ auto | disable-redundancy-check | poll-interval | threshold]
```

## Parameters

*auto*

Enable auto SFM walk.

*disable-redundancy-check*

Disables SFM Walk redundancy check.

*poll-interval*

Sets SFM Walk poll-interval.

*threshold*

sets SFM Walk reassembly error threshold.

## Modes

Global configuration mode

## Usage Guidelines

By default, SFM walk and redundancy check are disabled.

## Examples

```

device(config)# sysmon sfm-walk ?
Possible completions:
  auto          Enable Auto SFM Walk (Default: Disabled)
  disable-redundancy-check  Disable SFM Walk redundancy check (Default:
                          Enabled)
  poll-interval Set SFM Walk poll-interval
  threshold     Set SFM Walk reassembly error threshold
device(config)# sysmon sfm-walk auto?
Possible completions:
  auto  Enable Auto SFM Walk (Default: Disabled)
device(config)# sysmon sfm-walk auto ?
Possible completions:
  <cr>
device(config)# sysmon sfm-walk disable-redundancy-check?
Possible completions:
  disable-redundancy-check  Disable SFM Walk redundancy check (Default:
                          Enabled)
device(config)# sysmon sfm-walk disable-redundancy-check ?
Possible completions:
  <cr>
device(config)# sysmon sfm-walk poll-interval?
Possible completions:
  poll-interval  Set SFM Walk poll-interval
device(config)# sysmon sfm-walk poll-interval ?
Possible completions:
  <1-600>  Default: 30 Sec
SLX(config)# sysmon sfm-walk poll-interval 500
The Client sysmgr is not Known or Connected

```

## History

Release version	Command history
16r.1.00	This command was introduced.

# sysmon link-crc-monitoring

Enables link-crc monitoring.

## Syntax

```
sysmon sfm-walk [ auto | disable-redundancy-check | poll-interval | threshold]
```

## Parameters

*action*

Sets Link CRC Monitoring actions.

*disable*

Disables link CRC Monitoring.

*poll-interval*

Sets link CRC monitoring poll-interval.

*threshold*

Sets link CRC Monitoring threshold.

## Modes

Global configuration mode

## Usage Guidelines

By default, link-crc monitoring is disabled. Default threshold is 5 and default poll-interval is 60 seconds.

## Examples

```
device(config)# sysmon link-crc-monitoring ?
Possible completions:
  action          Set Link CRC Monitoring action
  disable         Disable Link CRC Monitoring (Default: Enabled)
  poll-interval  Set Link CRC Monitoring poll-interval
  threshold       Set Link CRC Monitoring threshold
device(config)# sysmon link-crc-monitoring threshold ?
Possible completions:
  <1-10>         Default: 5
device(config)# sysmon link-crc-monitoring threshold 9
device(config)# sysmon link-crc-monitoring poll-interval ?
Possible completions:
  <1-300>        Default: 60 Sec
device(config)# sysmon link-crc-monitoring poll-interval 500
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# system-description

Sets the global system description specific to LLDP.

## Syntax

`system-description` *line*

`no system-description`

## Parameters

*line*

Specifies a description for the LLDP system. The string must be between 1 and 50 ASCII characters in length.

## Modes

Protocol LLDP configuration mode

## Usage Guidelines

Enter `no system-description` to clear the global LLDP system description.

## Examples

To set the global system description specific to LLDP on the SLX-OS platform, enter the following:

```
device(conf-lldp)# system-description SLXR
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# system-monitor tm

Accesses system monitor traffic manager (sys-mon TM) configuration mode to configure the monitoring of the traffic manager (TM) device or Virtual Output Queue (VOQ) discarded packets.

## Syntax

```
system-monitor tm
no system-monitor tm
```

## Modes

Global configuration mode

## Usage Guidelines

By default, the monitoring of the TM device and VOQ discarded packets is disabled until you configure their threshold.

Use the **no** form of this command to reset the monitoring of the TM device and VOQ discarded packets configurations to their default values and disable the monitoring of the packets.

## Examples

The following example enables VOQ discarded packets monitoring and accesses sys-mon TM configuration mode.

```
device# configure terminal
device (config)# system-monitor tm
device (config-sys-mon-tm)#
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# system-monitor-mail

Configures various email settings as part of system monitoring.

## Syntax

```
system-monitor-mail [ fru | interface | relay | security |sfp]
```

## Parameters

<i>fru</i>	Configure FRU mail settings.
<i>interface</i>	Configure interface mail settings.
<i>relay</i>	Configure relay ip mail settings.
<i>security</i>	Configure security mail settings.
<i>sfp</i>	Configure sfp mail settings.

## Modes

Global configuration mode

## Examples

```
device(config)# system-monitor-mail ?
Possible completions:
  fru          Configure FRU mail settings
  interface    Configure interface mail settings
  relay        Configure relay ip mail settings
  security     Configure security mail settings
  sfp          Configure sfp mail settings
device(config)# system-monitor-mail fru ?
Possible completions:
  <email:string> e-mail address for FRU alerts
  enable        Enable FRU email alerts
device(config)# system-monitor-mail fru enable ?
Possible completions:
  <cr>
device(config)# system-monitor-mail fru enable?
Possible completions:
  enable        Enable FRU email alerts
device(config)# system-monitor-mail fruemail ?
  ^
% Invalid input detected at '^' marker.
device(config)# system-monitor-mail fru email ?
Possible completions:
  <cr>
device(config)# system-monitor-mail fru ncp@extreme.com
device(config)#
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# system-monitoring power alert state removed action raslog

Monitors the power supply component and generates RASLog when the component changes from the configured state.

## Syntax

**system-monitoring power alert state removed action raslog**

## Parameters

*Alert*

Configure alerts for the POWER SUPPLY component.

*State*

Specifies the supported states for component (power supply) that may be monitored.

*action*

Specifies the action that may be taken when component (power supply) changes from the configured state.

## Modes

Global configuration mode

## Examples

```
device(config)# system-monitor power ?
Possible completions:
  alert      Configure alerts for component:POWER SUPPLY
  threshold  Configure threshold for component:POWER SUPPLY
device(config)# system-monitor power alert ?
Possible completions:
  action     Action that may be taken when component:POWER SUPPLY changes
             configured state
  state      Supported states for component: POWER-SUPPLY that may be monitored
device(config)# system-monitor power alert state ?
Possible completions:
[removed] all faulty inserted none on removed
device(config)# system-monitor power alert state removed ?
Possible completions:
  action     Action that may be taken when component:POWER SUPPLY changes
             configured state
<cr>
device(config)# system-monitor power alert state removed action ?
Possible completions:
[raslog] all email none raslog
device(config)# system-monitor power alert state removed action raslog ?
Possible completions:
<cr>
device(config)# system-monitor power alert state removed action raslog
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# system-name

Sets the global system name specific to LLDP.

## Syntax

**system-name** *name*

**no system-name**

## Command Default

The host name from the device is used.

## Parameters

*name*

Specifies a system name for the LLDP. The string must be between 1 and 32 ASCII characters in length.

## Modes

Protocol LLDP configuration mode

## Usage Guidelines

Enter **no system-name** to delete the name.

## Examples

To specify a system name for the LLDP:

```
device(conf-lldp)# system-name System10
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# system power-cycle-db-shutdown

Shuts down the chassis configuration database gracefully without restarting the device for a planned power-cycle.

## Syntax

```
system power-cycle-db-shutdown
```

## Command Default

The chassis configuration database is running normally.

## Modes

Global configuration mode

## Usage Guidelines

When devices encounter abrupt power cycles, there have been rare cases of device configuration database corruption. This database corruption causes the device to reboot and reverts the device to the startup configuration.

In the case of scheduled power-cycles, it is recommended to use the **system power-cycle-db-shutdown** command before actual restarting the device.

This command shuts down the chassis configuration database, without rebooting the device. All commands (except for the **reload** command) are blocked on this node until the node is restarted. The node also informs its HA-peer to shut-down its database gracefully and not handle any database requests henceforth.

### NOTE

Suppose the configuration database on a switch gets corrupted due to an abrupt power cycle, run the **firmware install** or the **write erase** commands to clean up the corrupted files and/or to reinstall the firmware.

The node is not fully functional until it restarts. This command should be run as part of any planned power outages.

## Examples

```
device# configure terminal
device(config)# system power-cycle-db-shutdown
Are you sure you want to shutdown database for power-cycle? [y/n]: y
2017/02/09-13:02:42, [DCM-1015], 51,, INFO, SLX9140, Switch is prepared for power-cycle. No clis will
work henceforth. Need power-cycle or reload to make switch fully functional.
Operation Successful.
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# table-map

Maps external entry attributes into the BGP routing table, ensuring that those attributes are preserved after being redistributed into OSPF.

## Syntax

**table-map** *string*

**no table-map** *string*

## Command Default

This option is disabled.

## Parameters

*string*

Specifies a route map to be whose attributes are to be preserved. Range is from 1 through 63 ASCII characters.

## Modes

BGP address-family IPv4 unicast configuration mode

BGP address-family IPv6 unicast configuration mode

BGP address-family IPv4 unicast VRF configuration mode

BGP address-family IPv6 unicast VRF configuration mode

## Usage Guidelines

Use the **no** form of the command to remove the table map.

Use this command only to set the tag values. Normally, a route map is applied on routes (and therefore the routes are updated) before it is stored in the BGP routing table. Use the **table-map** command to begin the update before the routes are stored in the IP routing table.

Configurations made by this command apply to all peers.

Route maps that contain **set** statements change values in routes when the routes are accepted by the route map. For inbound route maps (route maps that filter routes received from neighbors), the routes are changed before they enter the BGP routing table. For tag values, if you do not want the value to change until a route enters the IP routing table, you can use a table map to change the value. A table map is a route map that you have associated with the IP routing table. The device applies the **set** statements for tag values in the table map to routes before adding them to the routing table. To configure a table map, you first configure the route map, then identify it as a table map. The table map does not require separate configuration. You can have only one table map.

**NOTE**

Use table maps only for setting the tag value. Do not use table maps to set other attributes. To set other route attributes, use route maps or filters. To create a route map and identify it as a table map, enter commands such those shown in the first example below. These commands create a route map that uses an address filter. For routes that match the IP prefix list filter, the route map changes the tag value to 100 and is then considered as a table map. This route map is applied only to routes that the device places in the IP routing table. The route map is not applied to all routes. The first example below assumes that IP prefix list p11 has already been configured.

## Examples

This example illustrates the execution of the **table-map** command.

```
device# configure terminal
device(config)# route-map tag_ip permit 1
device(config-route-map/tag_ip/permit/1)# match ip address prefix-list p11
device(config-route-map/tag_ip/permit/1)# set tag 100
device(config-route-map/tag_ip/permit/1)# exit
device(config)# router bgp
device(config-bgp-router)# address-family ipv4 unicast
device(config-bgp-ipv4u)# table-map tag_ip
```

This example removes the table map for the default VRF.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv4 unicast
device(config-bgp-ipv4u)# no table-map tag_ip
```

This example removes the table map for VRF "red".

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv6 unicast vrf red
device(config-bgp-ipv6u-vrf)# no table-map tag_ip
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# tacacs-server

Configures a Terminal Access Controller Access-Control System plus (TACACS+) server.

## Syntax

```
tacacs-server { host hostname [ use-vrf vrf-name ]
tacacs-server { source-ip [ chassis-ip | mm-ip ] }
[ port portnum ]
[ protocol { chap | pap } ]
[ key shared_secret ]
[ encryption-level value_level ]
[ timeout secs ]
[ retries num ]
no tacacs-server { host hostname | source-ip [ chassis-ip | mm-ip ] } [ use-vrf vrf-name ]
```

## Command Default

Refer to the Parameters section for specific defaults.

## Parameters

### host *hostname*

Specifies the IP address or domain name of the TACACS+ server. IPv4 and IPv6 addresses are supported.

### use-vrf *vrf-name*

Specifies a VRF through which to communicate with the TACACS+ server. See the Usage Guidelines.

### tacacs-server source-ip [*chassis-ip* | *mm-ip* ]

Specifies the chassis IP address or MM IP address as the source IP address for TACACS+ authentication and accounting.

### port *portnum*

Specifies the authentication port. Valid values range from 0 through 65535. The default is 49.

### protocol { *chap* | *pap* }

Specifies the authentication protocol. Options include CHAP and PAP. The default is CHAP.

### key *shared\_secret*

Specifies the text string that is used as the shared secret between the device and the TACACS+ server to make the message exchange secure. The key must be between 1 and 40 characters in length. The default key is **sharedsecret**. The exclamation mark (!) is supported both in RADIUS and TACACS+ servers, and you can specify the password in either double quotes or the escape character (\), for example **"secret!key"** or **secret\!key**. The only other valid characters are alphanumeric characters (such as a-z and 0-9) and underscores. No other special characters are allowed.

**encryption-level** *value\_level*

Designates the encryption level for the shared secret key operation. This operand supports JITC certification and compliance. The valid values are 0 and 7, with 0 being clear text and 7 being the most heavily encrypted. The default value is 7.

**timeout** *secs*

Specifies the time to wait for the TACACS+ server to respond. The default is 5 seconds.

**retries** *num*

Specifies the number of attempts allowed to connect to a TACACS+ server. The default is 5 attempts.

## Modes

Global configuration mode

## Usage Guidelines

If a TACACS+ server with the specified IP address or host name does not exist, it is added to the server list. If the TACACS+ server already exists, this command modifies the configuration. The **key** parameter does not support an empty string.

Executing the **no** form of the **tacacs-server** command attributes resets the specified attributes to their default values.

### NOTE

Before downgrading to a software version that does not support the **encryption-level** keyword, set the value of this keyword to **0**. Otherwise, the firmware download will throw an error that requests this value be set to **0**.

Before downgrading to a version that doesn't support **tacacs-server source-ip**, you must remove the source-ip configuration using **no tacacs-server source-ip**. Otherwise, the firmware download process throws an error requesting to reset the cipher.

By default, all management services are enabled on the management VRF ("mgmt-vrf") and the default VRF ("default-vrf").

## Examples

To configure an IPv4 TACACS+ server:

```
device# configure terminal
device(config)# tacacs-server host 10.24.65.6
device(config-host-10.24.65.6/mgmt-vrf)# tacacs-server source-ip chassis-ip
device(config-host-10.24.65.6/mgmt-vrf)# protocol chap retries 100
device(config-host-10.24.65.6/mgmt-vrf)#
```

To modify an existing TACACS+ server configuration:

```
device# configure terminal
device(config)# tacacs-server host 10.24.65.6
device(config-tacacs-server-10.24.65.6/mgmt-vrf)# key "changedsec"
```

To delete a TACACS+ server:

```
device# configure terminal
device(config)# no tacacs-server host 10.24.65.6
```



To configure an IPv6 TACACS+ server:

```
device# configure terminal
device(config)# tacacs-server host fec0:60:69bc:94:211:25ff:fec4:6010
device(config-tacacs-server-fec0:60:69bc:94:211:25ff:fec4:6010/mgmt-vrf)# protocol chap key "mysecret"
device(config-tacacs-server-fec0:60:69bc:94:211:25ff:fec4:6010/mgmt-vrf)# tacacs-server source-ip
chassis-ip
device(config-tacacs-server-fec0:60:69bc:94:211:25ff:fec4:6010/mgmt-vrf)#
```

## History

Release version	Command history
16.r.1.00	This command was introduced.

# telemetry client-cert

Generates the SSL certificate used by Telemetry server and client for a secure connection.

## Syntax

```
telemetry client-cert { generate | delete }
```

## Command Default

There is no SSL certificate.

## Parameters

### generate

Generates the certificate

### delete

Deletes the certificate.

## Modes

Privileged EXEC mode

## Usage Guidelines

Use the **telemetry client-cert delete** to delete the SSL certificate for Telemetry server and clients.

## Examples

Typical command execution example.

```
device# telemetry client-cert generate
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# telemetry collector

Activates Telemetry collector configuration mode.

## Syntax

```
telemetry collector { telemetry-collector-name }
```

## Command Default

Telemetry collector configuration mode is deactivated.

## Parameters

*telemetry-collector-name*

A unique name for a Telemetry collector. The name can be a string of up to 32 characters, consisting of letters, digits, and the underscore.

## Modes

Global configuration mode

## Usage Guidelines

Update operations are allowed only when telemetry collector is in deactivated ("no activate") state.

## Examples

Typical command example for activating Telemetry collector configuration mode.

```
device# configure terminal
device(config)# telemetry collector collector_1
device(config-telemetry-collector_collector_1)#
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# telemetry profile

Enters Telemetry profile configuration mode.

## Syntax

```
telemetry profile [profile-type] { default_interface_statistics | default_system_utilization_statistics }
```

```
no telemetry profile [profile-type] { default_interface_statistics | default_system_utilization_statistics }
```

## Command Default

The Telemetry profile configuration mode is deactivated.

## Parameters

### profile-type

The type of profile for the telemetry configuration. The available profile types are **system-utilization** and **interface**.

### default\_interface\_statistics

Profile for tracking interface statistics.

### default\_system\_utilization\_statistics

Profile for tracking system utilization statistics.

## Modes

Global configuration mode

## Usage Guidelines

The "no" command is not supported for default telemetry profiles. Only the default telemetry profiles are supported. If a telemetry profile has no attributes, no information is streamed to the collector.

The interface statistics gathered by the default\_interface\_statistics profile are:

- In/Out packets
- In/Out unicast packets
- In/Out broadcast packets
- In/Out multicast packets
- In/Out packets per second
- In/Out octets
- In/Out errors
- In/Out CRC errors
- In/Out discards

The system utilization statistics gathered by the default\_system\_utilization\_statistics profile are:

- Total system memory

- Total used memory
- Total free memory
- Cached memory
- Buffers
- User free memory
- Kernel free memory
- Total swap memory
- Total free swap memory
- Total used swap memory
- User process
- System process
- Niced process
- lo wait
- Hw interrupt
- Sw interrupt
- Idle state
- Steal time
- Uptime

## Examples

Example of entering telemetry profile configuration mode.

```
device# configure terminal
device(config)# telemetry profile interface default_interface_statistics
device(config-interface-default_interface_statistics)#
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# telemetry server

Activates Telemetry server configuration mode.

## Syntax

```
telemetry server
```

## Command Default

Telemetry server configuration mode is deactivated.

## Modes

Global configuration mode

## Usage Guidelines

Update and No operations are allowed only when telemetry server is in deactivated ("no activate") state.

## Examples

Typical command example for activating Telemetry server configuration mode.

```
device# configure terminal
device(config)# telemetry server
device(config-telemetry-server)#
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# telnet

Establishes a Telnet session to a remote networking device.

## Syntax

```
telnet IP_address [ port-number port_number ] [ vrf name ]
```

```
telnet hostname } [ port-number port_number ] [ interface { ethernet slot/port } | management | { ve number } ] [ vrf name ]
```

## Command Default

The default port is 23.

## Parameters

*IP\_address*

The server IP address in either IPv4 or IPv6 format.

**port-number** *port*

Specifies the port number in the remote device to connect to. Range is from 0 through 65535. For the connection to succeed, a TCP server must be listening for client connections at the specified port.

**vrf** *vrf-name*

Specifies a VRF instance. See the Usage Guidelines.

*hostname*

Specifies the host name which is a string between 1 and 63 ASCII characters in length.

**port-number** *port*

Specifies the port number in the remote device to connect to. Range is from 0 through 65535. For the connection to succeed, a TCP server must be listening for client connections at the specified port.

**interface**

Specifies an interface.

**ethernet** *slot/port*

Specified the Ethernet interface slot and port number.

**management**

Specifies a management interface.

**ve** *VE-id*

Specifies the VE interface number.

## Modes

Privileged EXEC mode

## Usage Guidelines

You can override the default port. However, the device must be listening on this port for the connection to succeed.

The following features are not supported:

- Display Telnet sessions
- Ability to terminate hung Telnet sessions

## Examples

The following example establishes a Telnet connection to a remote device.

```
device# telnet 10.20.51.68 vrf mgmt-vrf
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# telnet server

Configures the Telnet server on the device.

## Syntax

```
telnet server standby enable
```

```
telnet server [ use-vrf name ] shutdown
```

```
no telnet server {standby | { [use-vrf name ] shutdown}}
```

## Command Default

The Telnet service is enabled by default.

Telnet service on the standby MM is disabled.

## Parameters

### standby enable

Enables the Telnet server on the standby management module (MM).

### use-vrf *name*

Specifies a user-defined VRF.

### shutdown

Disables the Telnet server.

## Modes

Global configuration mode

## Usage Guidelines

Use the **no** form of the command to disable the standby MM Telnet service, or re-enable the Telnet service on the device. If you include the VRF name, the Telnet server for the VRF is re-enabled.

Shutting down the Telnet service forcibly disconnects all Telnet sessions running on a device.

When you use the **telnet server shutdown** command without a user-defined VRF, the service is shut down on mgmt-vrf only.

Telnet services are associated and started on mgmt-vrf and default-vrf.

Telnet server can be enabled on a maximum number of six VRFs.

## Examples

The following example shuts down the Telnet server on the device.

```
device# configure terminal
device(config)# telnet server shutdown
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# terminal

Sets terminal parameters for the current session.

## Syntax

**terminal length** *lines*

**terminal monitor**

**terminal no length**

**terminal timeout** *seconds*

**no terminal** { **monitor** | **timeout** }

## Command Default

The terminal length is 24 lines.

The terminal timeout is 600 seconds (10 minutes).

## Parameters

**length** *number\_of\_lines*

Specifies the number of lines to be displayed. Valid values range from 1 through 512. Specify 0 for infinite length.

**monitor**

Enables terminal monitoring.

**timeout** *seconds*

Specifies the timeout value in minutes. Enter an integer from 1 to 8192. Specify 0 to disable the timeout.

## Modes

Privileged EXEC mode

## Usage Guidelines

Use the **no** form of the command to reset the default timeout or disable monitoring.

Use the **terminal no length** command to reset the default number of displayed lines.

The **timeout** overrides the timeout configuration set by the **line vty exec-timeout** command, but only for the duration of the current session. When the current session ends, the configured values apply for any subsequent sessions.

## Examples

The following example sets the display length to 30 lines.

```
device# terminal length 30
```

The following example sets timeout length to 3600 seconds (60 minutes).

```
device# terminal timeout 3600
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# test-profile

Creates a test profile.

## Syntax

**test-profile** *test-profile-name*

**no test-profile**

## Parameter:

*test-profile-name*

Specifies the test profile name. A test profile name can be a maximum of 32 characters .

## Command Default

This feature is disabled.

## Modes

Y.1731 configuration mode

## Usage Guidelines

Use the **no** form of the command to delete the corresponding configured test profile and also its associations with Source and Target MEP pair.

## Examples

This example shows how to create a test profile .

```
device# configure terminal
device(config)# protocol cfm
device(protocol-cfm)# test-profile my_test_profile
```

## History

Release version	Command history
17r.1.01	This command was introduced.

# threshold

Specifies if the measurement exceeds the configured average or max threshold value.

## Syntax

```
threshold { forward | backward } [ { average value | max value } ]
no threshold
```

## Command Default

## Parameters

### forward

Defines the forward direction.

### backward

Defines the backward direction.

### average *value*

Defines the average value.

### max *value*

Defines the maximum value.

## Modes

Y.1731 configuration mode

## Usage Guidelines

The **threshold** command specifies if the measurement exceeds the configured average or max threshold value in the backward or forward direction, then Syslogs or SNMP traps need to be generated.

The **average-threshold** parameter specifies that when the average-threshold value in the applied profile is exceeded, take actions as configured in the action profile for this event.

The **max-threshold** parameter specifies that when the max-threshold value in the applied profile is exceeded, take actions as configured in the action profile for this event.

## Examples

Example of setting the direction and average threshold.

```
device# configure terminal
device(config)# protocol cfm
device(protocol-cfm)# y1731
device(protocol-cfm-y1731)# test-profile my_test_profile
device(protocol-cfm-y1731-my_test_profile)# threshold backward
device(protocol-cfm-y1731-my_test_profile)# threshold average 25
device(protocol-cfm-y1731-my_test_profile)# exit
```

## History

Release version	Command history
17r.1.01a	This command was introduced.

# threshold (ETH-SLM)

Configures the ETH-SLM threshold.

## Syntax

```
threshold { backward [ average average-value | maximum maximum-value ] | forward [ average average-value | maximum maximum-value ] }
```

```
no threshold { backward [ average average-value | maximum maximum-value ] | forward [ average average-value | maximum maximum-value ] }
```

## Parameters:

### backward

Specifies ETH-SLM backward threshold.

### average *average-value*

Specifies the ETH-SLM backward average threshold value. The average value range is from 1 to 4294967295.

### maximum *maximum value*

Specifies the ETH-SLM backward maximum threshold value. The average value range is from 1 to 4294967295.

### forward

Specifies ETH-SLM forward threshold.

## Command Default

The default value for average threshold is 4294967295 uSec. The default value for maximum threshold is 4294967295 uSec.

## Modes

Y1731 configuration mode

## Usage Guidelines

Use the **no** form of the command to delete the threshold configuration.



## Examples

This example shows how to configure the threshold value.

```
device# configure terminal
device (config-cfm)# protocol cfm
device (config-cfm)# y1731
device (config-cfm-y1731)# test-profile my_test_profile
device (config-cfm-y1731-test-profile-my_test_profile)# type delay-measurement
device (config-cfm-y1731-test-profile-my_test_profile)# tx-interval 60
device (config-cfm-y1731-test-profile-my_test_profile)# measurement-interval 30
device (config-cfm-y1731-test-profile-my_test_profile)# start at 00:00:00 daily
device (config-cfm-y1731-test-profile-my_test_profile)# stop at 23:59:00
device (config-cfm-y1731-test-profile-my_test_profile)# cos 7
device (config-cfm-y1731-test-profile-my_test_profile)# threshold forward maximum 3294967295
```

## History

Release version	Command history
17r.1.01	This command was introduced.

# threshold (ETH-DM)

Configures the ETH-DM threshold.

## Syntax

**threshold** [ **average** *average-threshold* | **maximum** *maximum-threshold* ]

**no threshold** [ **average** *average-threshold* | **maximum** *maximum-threshold* ]

## Parameters:

**average** *average-threshold*

Specifies the average threshold. The valid value is from 1 to 4294967295.

**maximum** *maximum-threshold*

Specifies the maximum threshold. The valid value is from 1 to 4294967295.

## Command Default

The default value for average threshold is 4294967295 uSec. The default value for maximum threshold is 4294967295 uSec.

## Modes

Y1731 configuration mode

## Usage Guidelines

Use the **no** form of the command to delete the threshold configuration.

## Examples

This example shows how to configure the threshold value.

```
device# configure terminal
device (config-cfm)# protocol cfm
device (config-cfm)# y1731
device(config-cfm-y1731)# test-profile my_test_profile
device(config-cfm-y1731-test-profile-my_test_profile)# type delay-measurement
device(config-cfm-y1731-test-profile-my_test_profile)# tx-interval 60
device(config-cfm-y1731-test-profile-my_test_profile)# measurement-interval 30
device(config-cfm-y1731-test-profile-my_test_profile)# start at 00:00:00 daily
device(config-cfm-y1731-test-profile-my_test_profile)# stop at 23:59:00
device(config-cfm-y1731-test-profile-my_test_profile)# cos 7
device(config-cfm-y1731-test-profile-my_test_profile)# threshold maximum 3294967295
```

## History

Release version	Command history
17r.1.01	This command was introduced.

# threshold-monitor cpu

Configures monitoring of CPU usage of the system and alerts the user when configured thresholds are exceeded.

## Syntax

```
threshold-monitor cpu [ [ actions [ none | raslog [ { limit limit_when_reached | poll polling_interval | retry
  number_of_retries ] ] ] ] }
```

```
no threshold-monitor cpu
```

## Parameters

### actions

Specifies the action to be taken when a threshold is exceeded.

### none

No action is taken.

### raslog

Specifies RASLog messaging.

### limit

Specifies the baseline CPU usage limit as a percentage of available resources.

#### *limit\_when\_reached*

When the limit set by this parameter is exceeded, a RASLog WARNING message is sent. When the usage returns below the limit, a RASLog INFO message is sent. Valid values range from 0 through 80 percent. The default is 70 percent.

### poll

Specifies the polling interval in seconds.

#### *polling\_interval*

The range is from 0 through 3600. The default is 120

### retry

Specifies the number of polling retries before desired action is taken.

#### *number\_of\_retries*

Range is from 1 through 100. The default is 3.

## Modes

Global configuration mode

## Usage Guidelines

This command sends a RASLog WARNING message when configured thresholds are exceeded.

## Examples

```
device(config)# threshold-monitor cpu actions rasloglimit 50 poll10
```

# threshold-monitor memory

Configures monitoring of the memory usage of the system and alerts the user when configured thresholds are exceeded.

## Syntax

```
threshold-monitor memory { [ actions [ none | raslog { high-limit percent | limit percent | low-limit percent | poll
polling_interval | retry number_of_retries } | high-limit percent | limit percent | low-limit percent | poll polling_interval | retry
number_of_retries ] ] }
```

no threshold-monitor memory

## Parameters

### actions

Specifies the action to be taken when a threshold is exceeded.

#### *none*

No action is taken. This is the default.

### raslog

Specifies RASLog messaging.

### high-limit

Specifies an upper limit for memory usage as a percentage of available memory.

*percent*

This value must be greater than the value set by **limit** . When memory usage exceeds this limit, a RASLog CRITICAL message is sent. Values range from 0 through 80 percent. The default is 70 percent.

### limit

Specifies the baseline memory usage limit as a percentage of available resources.

*percent*

When this value is exceeded, a RASLog WARNING message is sent. When the usage returns below the value set by **limit** , a RASLog INFO message is sent. Values range from 0 through 80 percent. The default is 60 percent.

### low-limit

Specifies a lower limit for memory usage as percentage of available memory.

*percent*

This value must be smaller than the value set by **limit** . When memory usage exceeds or falls below this limit, a RASLog INFO message is sent. The default is 40 percent.

### poll

Specifies the polling interval in seconds.

*polling\_interval*

The range is from 0 through 3600. The default is 120

### retry

Specifies the number of polling retries before desired action is taken.

*number\_of\_retries*

Range is from 1 through 100. The default is 3.

## Modes

Global configuration mode

## Examples

```
device(config)# threshold-monitor memory actions none high-limit 80 low-limit 50 limit 70 retry 2 poll  
30
```

# threshold-monitor sfp

Configures monitoring of SFP parameters.

## Syntax

```
threshold-monitor sfp { [ apply policy_name | pause | policy policy_name ] type SFP_type area parameters alert [ above
  [ highthresh-action [ [ all | lowthresh-action ] | email | none | raslog ] | lowthresh-action [ all | email none | raslog ] | below
  [ highthresh-action [ all | email | none raslog ] | lowthresh-action [ all | email | none | raslog ] ] | threshold [ buffer | high-
  threshold | low-threshold | timebase [ day | hour | minute | none ] ] ] }
```

```
no threshold-monitor sfp
```

## Command Default

By default, SFP is not monitored.

## Parameters

### apply *policy\_name*

Applies a custom policy that has been created by the **policy** operand.

### pause

Pause monitoring.

### policy

Specifies a policy name for monitoring by means of custom settings, rather than default settings. A policy name is required before additional configurations can be made. This operation is not supported from a secondary node.

#### *policy\_name*

Name of a custom policy configuration that can be saved and applied by means of the **apply** operand.

### type

Specifies the SFP type. Possible completions are as follows:

#### 1GLR

— SFP Type 1GLR

#### 1GSR

— SFP Type 1GSR

#### 10GLR

— SFP Type 10GLR

#### 10GSR

— SFP Type 10GSR

#### 10GUSR

— SFP Type 10GUSR

#### 100GSR

— SFP Type 100GSR

#### QSFP

— SFP type QSFP



**area**

Specifies one of the following SFP parameters to be monitored. See Defaults, below.

**Current**

Measures the current supplied to the SFP transceiver.

**RXP**

Measures the incoming laser power, in microWatts ( $\mu$ W).

**TXP**

Measures the outgoing laser power, in  $\mu$ W).

**Temperature**

Measures the temperature of the SFP, in degrees Celsius.

**Voltage**

Measures the voltage supplied to the SFP.

**alert**

Specifies whether an alert is sent when a threshold value is either above or below a threshold trigger.

**above**

Enables setting a value for **highthresh-action**, which specifies the action to be taken when a high threshold is exceeded.

**below**

Enables setting a value for **highthresh-action** and **lowthresh-action**, which specifies the action to be taken when a low threshold is exceeded.

**all**

Specifies that email and RASLog messaging are used, and that Port Fencing is applied in the case of **highthresh-action** only.

**all**

Specifies that email and RASLog messaging are used.

**email**

Specifies that an email message is sent.

**none**

Specifies that no alert is sent.

**raslog**

Specifies RASLog messaging.

**limit**

Specifies the percent of threshold usage, from 0 through 80. The default is 75.

**poll**

Specifies the polling interval in seconds, from 0 through 3600. The default is 120.

**retry**

Specifies the number of polling retries before desired action is taken, from 1 through 100. The default is 3.

**threshold**

Specifies the values for high, low, buffer, and timebase thresholds. These values are used to trigger different alerts and Port Fencing.

**buffer**

An integer value.

**high-threshold**

An integer value.

**low-threshold**

An integer value.

**timebase**

Calculates differences between current and previous data taken over a variety of intervals, for comparison against the preset threshold boundary.

**day**

Calculates the difference between a current data value and that value a day ago.

**hour**

Calculates the difference between a current data value and that value an hour ago.

**minute**

Calculates the difference between a current data value and that value a minute ago.

**none**

Compares a data value to a threshold boundary level.

## Modes

Global configuration mode

## Examples

A typical command might look like this:

```
device(config)# threshold-monitor sfp custom type QSFP area rxp threshold high-threshold 2000 low-threshold 1000
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# tie-breaking

The user can optionally configure the device to choose the path that has either the highest available bandwidth or the lowest available bandwidth.

## Syntax

```
tie-breaking { [ least-fill | most-fill | random ] }
no tie-breaking { [ least-fill | most-fill | random ] }
```

## Command Default

The default is the tie-breaking random mode.

## Parameters

### least-fill

Causes CSPF to choose the path with the highest available bandwidth (that is, the path with the least utilized links).

### most-fill

Causes CSPF to choose the path with the lowest available bandwidth (that is, the path with the most utilized links).

### random

Causes CSPF to choose the path randomly from the equal-cost paths.

## Modes

MPLS LSP configuration mode (`config-router-mpls-lsp-lsp_name`).

MPLS router bypass LSP configuration mode (`config-router-mpls-bypass-lsp-bypass_name`)

MPLS router MPLS interface dynamic bypass configuration mode (`config-router-mpls-if-ethernet-slot/port-dynamic-bypass`)

## Usage Guidelines

The **no** form of the command removes the tie-breaking configuration and reverts to the default mode.

The user can configure an interface level tie-breaking option for the CSPF calculation of dynamic bypass LSPs to be created for the protected MPLS interface. The set value is used for dynamic bypass LSP path computation tie-breaking procedure.

## Examples

In the following example, the configuration causes the CSPF to select the path with the highest available bandwidth when choosing among equal cost paths calculated for LSP *tunnel1*.

```
device# configure
device(config)# router mpls
device(config-router-mpls)# lsp tunnel1
device(config-router-mpls-lsp-tunnel1)# tie-breaking least-fill
```

The following example configures the tie-breaking path bandwidth to the **least-fill** option for dynamic bypass MPLS Ethernet interface 2/8 .

```
device# configure
device(config)# router mpls
device(config-router-mpls)# mpls-interface ethernet 2/8
device(config-router-mpls-if-ethernet-2/8)# dynamic-bypass
device(config-router-mpls-if-ethernet-2/8-dynamic-bypass)# tie-breaking least-fill
```

## History

Release version	Command history
16r.1.00	This command was introduced.
17r.1.00	This command was modified to include the MPLS router bypass LSP and dynamic bypass configuration modes.

# timeout

Specifies the wait time allowed for a Remote Authentication Dial-In User Service (RADIUS) server response.

## Syntax

`timeout sec`

`no timeout`

## Command Default

The default wait time is 5 seconds.

## Parameters

`sec`

Specifies the wait time (in seconds) allowed for a RADIUS server response. The range is from 1 through 60. The default value is 5.

## Modes

RADIUS server host VRF configuration mode

## Usage Guidelines

The `no` form of the command restores the command default value.

## Examples

The following example shows how to configure a wait time of 10 seconds.

```
device# configure terminal
device(config)# radius-server host 10.37.73.180 use-vrf green-vrf
device(config-host-10.37.73.180/green-vrf)# timeout 10
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# timeout

Configures timeout in seconds.

## Syntax

**timeout** *timeout-value*

**no timeout** *timeout-value*

## Parameters:

*timeout-value*

Specifies the timeout value. The range is from 1 to 4 seconds.

## Command Default

The default value for timeout is 1 second.

## Modes

Y1731 configuration mode

## Usage Guidelines

Use the **no** form of the command to delete the timeout configuration.

## Examples

This example shows how to configure the timeout value.

```
device# configure terminal
device (config-cfm)# protocol cfm
device (config-cfm)# y1731
device(config-cfm-y1731)# test-profile my_test_profile
device(config-cfm-y1731-test-profile-my_test_profile)# type delay-measurement
device(config-cfm-y1731-test-profile-my_test_profile)# tx-interval 60
device(config-cfm-y1731-test-profile-my_test_profile)# measurement-interval 30
device(config-cfm-y1731-test-profile-my_test_profile)# start at 00:00:00 daily
device(config-cfm-y1731-test-profile-my_test_profile)# stop at 23:59:00
device(config-cfm-y1731-test-profile-my_test_profile)# cos 7
device(config-cfm-y1731-test-profile-my_test_profile)# threshold maximum 3294967295
device(config-cfm-y1731-test-profile-my_test_profile)# timeout 1
```

## History

Release version	Command history
17r.1.01	This command was introduced.

# timeout (link-oam)

Allows you to configure timeout value, which corresponds to hold time before the Discovery process restarts.

## Syntax

`timeout sec`

`no timeout`

## Command Default

The default wait time is 5 seconds.

## Parameters

`sec`

Specifies the hold time (in seconds) before the discovery process restarts. The range is from 1 through 10. The default value is 5.

## Modes

Link OAM configuration mode

## Usage Guidelines

The **no** form of the command restores the command default value.

## Examples

The following example shows how to configure a wait time of 10 seconds.

```
device(config-link-oam)# timeout 4
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# timers (BGP)

Adjusts the interval at which BGP KEEPALIVE and HOLDTIME messages are sent.

## Syntax

```
timers { keep-alive keepalive_interval hold-time holdtime_interval }
no timers
```

## Parameters

**keep-alive** *keepalive\_interval*

Frequency in seconds with which a device sends keepalive messages to a peer. Range is from 0 through 65535 seconds. The default is 60.

**hold-time** *holdtime\_interval*

Interval in seconds that a device waits to receive a keepalive message from a peer before declaring that peer dead. Range is from 0 through 65535 seconds. The default is 180.

## Modes

BGP configuration mode

## Usage Guidelines

The KEEPALIVE and HOLDTIME message interval is overwritten when the **fast-external-failover** command takes effect on a down link to a peer.

You must enter a value for **keep-alive** before you can enter a value for **hold-time**. Both values must be entered. If you only want to adjust the value of one parameter, enter the default value of the parameter that you do not want to adjust.

The **no** form of the command clears the timers.

## Examples

The following example sets the keepalive timer for a device to 120 seconds and the hold-timer to 360 seconds.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# timers keep-alive 120 hold-time 360
```

The following example sets the keepalive timer for a device to 0 seconds and the hold-timer to 0 seconds so that the device waits indefinitely for messages from a neighbor without tearing down the session.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# timers keep-alive 0 hold-time 0
```



# History

Release version	Command history
16r.1.00	This command was introduced.

# timers (OSPFv2)

Configures Link State Advertisement (LSA) pacing and Shortest Path First (SPF) throttle timers.

## Syntax

```
timers { lsa-group-pacing interval | throttle spf start hold max }
```

## Command Default

See the parameters section for specific defaults.

## Parameters

### lsa-group-pacing *interval*

Specifies the interval at which OSPF LSAs are collected into a group and refreshed, check-summed, or aged by the OSPF process. Valid values range from 10 to 1800 seconds. The default is 240 seconds.

### throttle spf

Specifies start, hold and maximum wait intervals for throttling SPF calculations for performance. The values you enter are in milliseconds.

#### *start*

Initial SPF calculation delay. Valid values range from 0 to 60000 milliseconds. The default is 0.

#### *hold*

Minimum hold time between two consecutive SPF calculations. Valid values range from 0 to 60000 milliseconds. The default is 0.

#### *max*

Maximum wait time between two consecutive SPF calculations. Valid values range from 0 to 60000 milliseconds. The default is 0.

## Modes

OSPF router configuration mode

OSPF VRF router configuration mode

## Usage Guidelines

The device paces LSA refreshes by delaying the refreshes for a specified time interval instead of performing a refresh each time an individual LSA refresh timer expires. The accumulated LSAs constitute a group, which the device refreshes and sends out together in one or more packets.

The LSA pacing interval is inversely proportional to the number of LSAs the device is refreshing and aging. For example, if you have a large database of 10,000 LSAs, decreasing the pacing interval enhances performance. If you have a small database of about 100 LSAs, increasing the pacing interval to 10 to 20 minutes may enhance performance.

The **no timers lsa-group-pacing** command restores the pacing interval to its default value.

The **no timers throttle spf** command sets the SPF timers back to their defaults.

## Examples

The following example sets the LSA group pacing interval to 30 seconds.

```
device# configure terminal
device(config)# router ospf
device(config-router-ospf-vrf-default-vrf)# timers lsa-group-pacing 30
```

The following example sets the SPF delay to 10000 milliseconds, the hold time to 15000 milliseconds, and the maximum wait time to 30000 milliseconds.

```
device# configure terminal
device(config)# router ospf
device(config-router-ospf-vrf-default-vrf)# timers throttle spf 10000 15000 30000
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# timers (OSPFv3)

Configures Link State Advertisement (LSA) pacing and Shortest Path First (SPF) timers.

## Syntax

```
timers { lsa-group-pacing interval | spf start hold }
```

## Command Default

Enabled.

## Parameters

**lsa-group-pacing** *interval*

Specifies the interval at which OSPFv3 LSAs are collected into a group and refreshed, check-summed, or aged by the OSPFv3 process. Valid values range from 10 to 1800 seconds. The default is 240 seconds.

**spf**

Specifies start and hold intervals for SPF calculations for performance. The values you enter are in milliseconds.

*start*

Initial SPF calculation delay. Valid values range from 0 to 65535 seconds.

*hold*

Minimum hold time between two consecutive SPF calculations. Valid values range from 0 to 65535 seconds.

## Modes

OSPFv3 router configuration mode

OSPFv3 router VRF configuration mode

## Usage Guidelines

The device paces LSA refreshes by delaying the refreshes for a specified time interval instead of performing a refresh each time an individual LSA refresh timer expires. The accumulated LSAs constitute a group, which the device refreshes and sends out together in one or more packets.

The LSA pacing interval is inversely proportional to the number of LSAs the device is refreshing and aging. For example, if you have a large database of 10,000 LSAs, decreasing the pacing interval enhances performance. If you have a small database of about 100 LSAs, increasing the pacing interval to 10 to 20 minutes may enhance performance.

The **no timers lsa-group-pacing** command restores the pacing interval to its default value.

The **no timers spf** command sets the SPF timers back to their defaults.

## Examples

The following example sets the LSA group pacing interval to 30 seconds.

```
device# configure terminal
device(config)# ipv6 router ospf
device(config-ipv6-router-ospf-vrf-default-vrf)# timers lsa-group-pacing 30
```

The following example sets the SPF delay time to 10 and the hold time to 20.

```
device# configure terminal
device(config)# ipv6 router ospf
device(config-ipv6-router-ospf-vrf-default-vrf)# timers spf 10 20
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# tlv-type

Enables the Port Status type-length-value (TLV) metric for the specified Maintenance End Points (MEP).

## Syntax

```
tlv-type { port-status-tlv }
no tlv-type port-status-tlv
```

## Command Default

The Port Status TLV is not enabled.

## Parameters

**port-status-tlv**  
Enables the Port Status TLV metric.

## Modes

CFM protocol configuration mode .

## Usage Guidelines

The **no tlv-type port-status-tlv** command disables the Port Status TLV metric for the specified MEP.

## Examples

Command example to enable the Port Status TLV metric.

```
device# configure terminal
device(config-cfm)# domain name md1 level 4
device(config-cfm-md-md1)# ma-name mal id 1 vlan-id 30 priority 3
device(config-cfm-md-ma-mal)# mep 1 down ethernet 1/2
device(config-cfm-md-ma-mep-1)# tlv-type port-status-tlv
```

## History

Release version	Command history
16r.1.01	This command was introduced.

## to

Configures a destination address for the bypass LSP.

## Syntax

```
to { ip_addr }
no to { ip_addr }
```

## Parameters

*ip\_addr*  
Specifies the destination or egress IPv4 address of the bypass LSP.

## Modes

MPLS router bypass LSP configuration mode

## Usage Guidelines

The destination address is mandatory to enable a bypass LSP.

The **no** form of the command removes the destination address of the bypass LSP.

## Examples

The following example configures the destination address to 33.33.33.33 for bypass LSP my-bypass-lsp.

```
device>configure
device(config)# router mpls
device(config-router-mpls)# bypass-lsp my-bypass-lsp
device(config-router-mpls-bypass-lsp-my-bypass-lsp)# to 33.33.33.33
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# topology-group

Configures the topology group.

## Syntax

```
topology-group group-id
```

```
no topology-group group-id
```

## Command Default

A topology group is not configured.

## Parameters

*group-id*

Specifies the topology group ID. The ID ranges from 1 through 256.

## Modes

Global configuration mode

## Usage Guidelines

Each topology group contains a master VLAN and can contain one or more member VLANs and VLAN groups. You must configure the master VLAN and member VLANs or member VLAN groups before you configure the topology group.

You can configure up to 30 topology groups. Each group can control up to 4096 VLANs. A VLAN cannot be controlled by more than one topology group. The topology group must contain a master VLAN and can also contain individual member VLANs, VLAN groups, or a combination of individual member VLANs and VLAN groups.

The **no** form of the command removes the topology group.

## Examples

The following example configures the topology group with ID 2 and adds master VLAN and member VLANs.

```
device# configure terminal
device(config)# topology-group 2
device(config-topo-group-2)# master-vlan 2
device(config-topo-group-2)# member-vlan 3
device(config-topo-group-2)# member-vlan 4
device(config-topo-group-2)# member-vlan 5
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# tpvm

Provides administrative support, for users without root privileges, for third-party virtual machine (TPVM) applications. Support for the management module (MM) is device dependent.

## Syntax

```
tpvm [ install | uninstall ] [ force ] [ blade { mm1 | mm2 } ]
tpvm [ start | stop ] [ blade { mm1 | mm2 } ]
tpvm auto-boot [ disable | enable ] [ blade { mm1 | mm2 } ]
tpvm disk { add name { disk_name | auto disk_size } | remove name { disk_name | auto } } [ blade { mm1 | mm2 } ]
tpvm show disk { disk_name | all } [ blade { mm1 | mm2 } ]
tpvm show ip-address [ blade { mm1 | mm2 } ]
tpvm password [ blade { mm1 | mm2 } ]
tpvm show status [ clear-tag tag-name ] [ blade { mm1 | mm2 } ]
tpvm help
```

## Command Default

This feature is not enabled.

## Parameters

### install

Installs TPVM.

### uninstall

Uninstalls TPVM if it is already installed.

### force

Clears installation or uninstallation errors, then tries to force an uninstallation.

### start

Starts TPVM.

### stop

Stops TPVM.

### auto-boot disable

Prevents TPVM from starting at the next reboot of SLX-OS.

### auto-boot enable

Starts TPVM at the next reboot of SLX-OS (without the need for the **start** keyword).

### disk add name

Adds a new disk to TPVM.

*disk\_name*

Name of the disk to be added if the **auto** keyword is not specified.

**auto**

Assigns a disk name automatically. See the Usage Guidelines.

*disk\_size*

Size of the disk (any positive integer). See the Usage Guidelines.

**disk remove name**

Removes an additional disk from TPVM.

*disk\_name*

Name of the additional disk to be removed. See the Usage Guidelines.

**show disk**

Displays disk information.

*disk\_name*

Specifies a disk.

**all**

Specifies all disks.

**show ip-address**

Displays IPv4 and IPv6 addresses that are configured on TPVM. See the Usage Guidelines.

**password**

Changes the root password on TPVM.

**show status**

Displays TPVM information.

**help**

Displays TPVM help options.

**blade mm1**

Specifies management module 1 on a device that supports this.

**blade mm2**

Specifies management module 2 on a device that supports this.

## Modes

Privileged EXEC mode

## Usage Guidelines

This administrative command is available at the SLX-OS shell and is invoked by means of the **oscmd** command (on the SLX 9850) or the **start-shell** command (on the SLX 9540). This command requires root privileges. The optional keywords **mm1** and **mm2** are for management module (MM) support only on the SLX 9850.

If the **auto** keyword is not used with the **add\_disk** command, the name of the disk must be that of the next disk. For example, if the last disk added to the system is *vdb*, the name of the next disk must be *vdc*.

You can add one of the following suffixes to specify disk size:

- b or B (bytes)
- k or K (kilobytes)
- m or M (megabytes)

- g or G (gigabytes)

If no suffix is used, the default is gigabytes.

The maximum number of disks supported is currently 3. If the number of allocated disks exceeds this number, the **add\_disk** keyword fails. Also, the total disk capacity is limited to 100 Gbytes on the SLX 9850 and 50 Gbytes on the SLX 9540.

If the **auto** keyword is not used with the **remove\_disk** command, the name of the disk must be that of the last disk added to the system..

#### ATTENTION

If the disk is mounted, it must be unmounted before it is removed from the system. Otherwise, the next added disk will be labeled incorrectly. If this happens, TPVM must be rebooted to recover.

## Examples

To install TPVM if it is not already installed:

```
[SLX]# tpvm install
```

To uninstall TPVM if it is installed:

```
[SLX]# tpvm uninstall
```

To force the clearing of installation or uninstallation errors by means of the **force** keyword:

```
[SLX]# tpvm uninstall force
```

To start TPVM if it is not running:

```
[SLX]# tpvm start
```

To stop TPVM if it is running:

```
[SLX]# tpvm stop
```

To start TPVM at the next reboot of SLX-OS (without the need for the **start** keyword):

```
[SLX]# tpvm auto-boot enable
```

To prevent TPVM from starting at the next reboot of SLX-OS:

```
[SLX]# tpvm auto-boot disable
```

#### NOTE

In this case, the **tpvm start** command is required to enable TPVM.

To display the current status of TPVM or any errors:

```
[SLX]# tpvm show status
```

To add a new disk to TPVM, by either using the **auto** keyword or specifying a disk name:

```
[SLX]# tpvm disk add name auto 10g
disk add succeeds
```

```
[SLX]# tpvm add_disk vdd 512m
disk add succeeds
```

#### NOTE

The maximum number of disks supported is currently 3. If the number of allocated disks exceeds this number, the **disk add name** keywords fail. Also, the total disk capacity is limited to 100 Gbytes on the SLX 9850 and 50 Gbytes on the SLX 9540. If you exceed this limit when you create a disk, the **disk add name** keywords fail.

To remove an additional disk from TPVM:

```
[SLX]# tpvm disk remove name auto
'umount' is needed before this disk is removed. Continue? [y/n]: y
disk remove succeeds
```

```
[SLX]# tpvm disk remove name vdc
'umount' is needed before this disk is removed. Continue? [y/n]: y
disk remove succeeds
```

#### ATTENTION

If the disk is mounted, it must be unmounted before it is removed from the system. Otherwise, the next added disk will be labeled incorrectly. If this happens, TPVM must be rebooted to recover.

To clear errors by means of the **clear <error>** keywords, where the error in this example is **"disk add"**:

```
[SLX]# tpvm disk add name auto 10g
disk add failed
```

```
[SLX]# tpvm show status
TPVM had runtime error(s) -- these error(s) seem not fatal, and the operation(s) could be retryable
disk add: virsh vol-create-as failed. error detail: error: Failed to create vol vde error: operation
failed: the number of volumes goes beyond the maximum
```

TPVM is running, and AutoStart is disabled on this host.

```
[SLX]# tpvm show status clear disk add
TPVM is running, and AutoStart is disabled on this host.
```

#### NOTE

The runtime error can be also removed automatically when the same subcommand succeeds.

To display disk information, by using either the **all** keyword or specifying a disk name:

```
[SLX]# tpvm show disk all
disk: vdb
Capacity: 70.00 GiB
Allocation: 196.00 KiB

disk: vdc
Capacity: 30.00 GiB
Allocation: 196.00 KiB

total:
Capacity: 100.00 GiB
Allocation: 100.00 GiB
Available: 0.00 B

[SLX]# tpvm show disk blade vdb
disk: vdb
Capacity: 70.00 GiB
Allocation: 196.00 KiB

total:
Capacity: 100.00 GiB
Allocation: 100.00 GiB
Available: 0.00 B
```

To display IPv4 and IPv6 addresses that are configured on TPVM, in this example on MM1:

```
[SLX]# tpvm show ip-address mm1
[ TPVM running on MM1 ]
IPv4:
eth0 10.24.7.80
IPv6:
eth0 fe80::5054:ff:fe9c:446d
eth1 fe80::7:d0ff:fe02:100
```

#### NOTE

The **show ip-address** keywords require the *qemu-guest-agent* package on TPVM. If this package is removed, the keyword fails.

To change the root password on TPVM, in this example on MM2:

```
[SLX]# tpvm password blade mm2
root password: <enter a new root password here..>
re-enter root password: <enter the root password again..>
password succeeds
```

To view all options by using the **help** keyword:

```
[SLX]# tpvm help
Usage: tpvm sub-command [ options ] [ mm1 | mm2 ]
sub-command:
  install          install TPVM
  uninstall        uninstall TPVM

  start           start TPVM
  stop            stop TPVM

  disk add name   add a new disk to TPVM
  disk remove name remove the disk from TPVM
  show status     show the disk information on TPVM

  auto-boot enable enable to start TPVM at boot
  auto-boot disable disable to start TPVM at boot

  show ip-address show TPVM IP address(es)
  password        update the TPVM root password

  show           show status or errors of TPVM
  help          show sub-command usage

run 'tpvm help <sub-command>' for detail
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# tpvmadm

Provides administrative support, for users with root privileges only, for third-party virtual machine (TPVM) applications. Support for the management module (MM) is device dependent.

## Syntax

```
tpvmadm install | uninstall [ -f ] [ mm1 | mm2 ]
tpvmadm start | stop [ mm1 | mm2 ]
tpvmadm disable_on_boot | enable_on_boot [ mm1 | mm2 ]
tpvmadm add_disk { disk_name | auto disk_size } | remove_disk { disk_name | auto } [ mm1 | mm2 ]
tpvmadm show_disk [ { disk_name | all } mm1 | mm2 ]
tpvmadm show_ipaddr [ mm1 | mm2 ]
tpvmadm update_password [ mm1 | mm2 ]
tpvmadm show [ mm1 | mm2 ]
tpvmadm help
```

## Command Default

This feature is not enabled.

## Parameters

**install**  
Installs TPVM.

**uninstall**  
Uninstalls TPVM if it is already installed.

**-f**  
Clears installation or uninstallation errors, then tries to force an uninstallation.

**start**  
Starts TPVM.

**stop**  
Stops TPVM.

**disable\_on\_boot**  
Prevents TPVM from starting at the next reboot of SLX-OS.

**enable\_on\_boot**  
Starts TPVM at the next reboot of SLX-OS (without the need for the **start** keyword).

**add\_disk**  
Adds a new disk to TPVM.

*disk\_name*  
Name of the disk to be added if the **auto** keyword is not specified.

**auto**

Assigns a disk name automatically. See the Usage Guidelines.

*disk\_size*

Size of the disk (any positive integer). See the Usage Guidelines.

**remove\_disk**

Removes an additional disk from TPVM.

*disk\_name*

Name of the additional disk to be removed. See the Usage Guidelines.

**show\_disk**

Displays disk information.

*disk\_name*

Specifies a disk.

**all**

Specifies all disks.

**show\_ipaddress**

Displays IPv4 and IPv6 addresses that are configured on TPVM. See the Usage Guidelines.

**update\_password**

Changes the root password on TPVM.

**show**

Displays TPVM information.

**help**

Displays TPVM help options.

**mm1**

Specifies management module 1.

**mm2**

Specifies management module 2.

## Modes

Privileged EXEC mode

## Usage Guidelines

This administrative command is available at the SLX-OS shell and is invoked by means of the **oscmd** command (on the SLX 9850) or the **start-shell** command (on the SLX 9540). This command requires root privileges. The optional keywords **mm1** and **mm2** are for management module (MM) support only on the SLX 9850.

If the **auto** keyword is not used with the **add\_disk** command, the name of the disk must be that of the next disk. For example, if the last disk added to the system is *vdb*, the name of the next disk must be *vdc*.

You can add one of the following suffixes to specify disk size:

- b or B (bytes)
- k or K (kilobytes)
- m or M (megabytes)



- g or G (gigabytes)

If no suffix is used, the default is gigabytes.

The maximum number of disks supported is currently 3. If the number of allocated disks exceeds this number, the **add\_disk** keyword fails. Also, the total disk capacity is limited to 100 Gbytes on the SLX 9850 and 50 Gbytes on the SLX 9540.

If the **auto** keyword is not used with the **remove\_disk** command, the name of the disk must be that of the last disk added to the system..

#### ATTENTION

If the disk is mounted, it must be unmounted before it is removed from the system. Otherwise, the next added disk will be labeled incorrectly. If this happens, TPVM must be rebooted to recover.

## Examples

To install TPVM if it is not already installed:

```
[root@SLX]# tpvmadm install
```

To uninstall TPVM if it is installed:

```
[root@SLX]# tpvmadm uninstall
```

To force the clearing of installation or uninstallation errors by means of the **-f** keyword:

```
[root@SLX]# tpvmadm uninstall -f
```

To start TPVM if it is not running:

```
[root@SLX]# tpvmadm start
```

To stop TPVM if it is running:

```
[root@SLX]# tpvmadm stop
```

To start TPVM at the next reboot of SLX-OS (without the need for the **start** keyword):

```
[root@SLX]# tpvmadm enable_on_boot
```

To prevent TPVM from starting at the next reboot of SLX-OS:

```
[root@SLX]# tpvmadm disable_on_boot
```

#### NOTE

In this case, the **tpvmadm start** command is required to enable TPVM.

To display the current status of TPVM or any errors:

```
[root@SLX]# tpvmadm show
```

To add a new disk to TPVM, by either using the **auto** keyword or specifying a disk name:

```
[root@SLX]# tpvmadm add_disk auto 10g
add_disk succeeds
```

```
[root@SLX]# tpvmadm add_disk vdd 512m
add_disk succeeds
```

#### NOTE

The maximum number of disks supported is currently 3. If the number of allocated disks exceeds this number, the **add\_disk** keyword fails. Also, the total disk capacity is limited to 100 Gbytes on the SLX 9850 and 50 Gbytes on the SLX 9540. If you exceed this limit when you create a disk, the **add\_disk** keyword fails.

To remove an additional disk from TPVM:

```
[root@SLX]# tpvmadm remove_disk auto
'umount' is needed before this disk is removed. Continue? [y/n]: y
remove_disk succeeds
```

```
[root@SLX]# tpvmadm remove_disk vdc
'umount' is needed before this disk is removed. Continue? [y/n]: y
remove_disk succeeds
```

#### ATTENTION

If the disk is mounted, it must be unmounted before it is removed from the system. Otherwise, the next added disk will be labeled incorrectly. If this happens, TPVM must be rebooted to recover.

To clear errors by means of the **-c <error>** keywords, where the error in this example is **add\_disk**:

```
[root@SLX]# tpvmadm add_disk auto 10g
add_disk failed
```

```
[root@SLX]# tpvmadm show
TPVM had runtime error(s) -- these error(s) seem not fatal, and the operation(s) could be retryable
add_disk: virsh vol-create-as failed. error detail: error: Failed to create vol vde error: operation
failed: the number of volumes goes beyond the maximum
```

TPVM is running, and AutoStart is disabled on this host.

```
[root@SLX]# tpvmadm show -c add_disk
TPVM is running, and AutoStart is disabled on this host.
```

#### NOTE

The runtime error can be also removed automatically when the same subcommand succeeds.

To display disk information, by using either the **all** keyword or specifying a disk name:

```
[root@SLX]# tpvmadm show_disk all
disk: vdb
Capacity: 70.00 GiB
Allocation: 196.00 KiB

disk: vdc
Capacity: 30.00 GiB
Allocation: 196.00 KiB

total:
Capacity: 100.00 GiB
Allocation: 100.00 GiB
Available: 0.00 B

[root@SLX]# tpvmadm show_disk vdb
disk: vdb
Capacity: 70.00 GiB
Allocation: 196.00 KiB

total:
Capacity: 100.00 GiB
Allocation: 100.00 GiB
Available: 0.00 B
```

To display IPv4 and IPv6 addresses that are configured on TPVM, in this example on MM1:

```
[root@SLX]# tpvmadm show_ipaddr mm1
[ TPVM running on MM1 ]
IPv4:
eth0 10.24.7.80
IPv6:
eth0 fe80::5054:ff:fe9c:446d
eth1 fe80::7:d0ff:fe02:100
```

#### NOTE

The **show\_ip\_addr** keyword requires the *qemu-guest-agent* package on TPVM. If this package is removed, the keyword fails.

To change the root password on TPVM, in this example on MM2:

```
[root@SLX]# tpvmadm update_passwd mm2
root password: <enter a new root password here..>
re-enter root password: <enter the root password again..>
update_passwd succeeds
```

To view all options by using the **help** keyword:

```
[root@SLX]# tpvmadm help
Usage: tpvmadm sub-command [ options ] [ mm1 | mm2 ]
sub-command:
  install          install TPVM
  uninstall        uninstall TPVM

  start           start TPVM
  stop            stop TPVM

  add_disk        add a new disk to TPVM
  remove_disk     remove the disk from TPVM
  show_disk       show the disk information on TPVM

  enable_on_boot  enable to start TPVM at boot
  disable_on_boot disable to start TPVM at boot

  show_ipaddr     show TPVM IP address(es)
  update_passwd   update the TPVM root password

  show            show status or errors of TPVM
  help           show sub-command usage

run 'tpvmadm help <sub-command>' for detail
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# traceroute

Traces the network path of packets as they are forwarded to a destination address.

## Syntax

```
traceroute { IPv4_address | host-name | ipv6 [ dest-ipv6-addr | host-name ] } [ interface ] [ maxttl value ] [ minttl value ] [ src-addr src-addr ] [ timeout seconds ] [ vrf vrf-name ]
```

## Parameters

*IPv4\_address*

Specifies the IPv4 address of the destination device.

*host-name*

Specifies the hostname of the destination device.

**ipv6** *dest-ipv6-addr*

Specifies the IPv6 address of the destination device.

**interface**

Selects the output interface.

**maxttl** *value*

Maximum Time To Live value in a number of hops.

**minttl** *value*

Minimum Time To Live value in a number of hops.

**src-addr** *address*

Specifies the IPv4 or IPv6 address of the source device.

**timeout** *seconds*

The traceroute timeout value.

**vrf** *vrf-name*

Name of the VRF. If no VRF is specified, the default-vrf is used.

## Modes

Privileged EXEC mode

## Usage Guidelines

To use the **traceroute** command on the management VRF, enter **mgmt-vrf**. You must enter the name of the management VRF manually.

## Examples

The following example executes an IPv6 traceroute, with minimum and maximum TTL values.

```
device# traceroute ipv6 fec0:60:69bc:92:218:8bff:fe40:1470 maxttl 128 minttl 30 src-addr fec0:60:69bc:
92:205:33ff:fe9e:3f20 timeout 3

traceroute to fec0:60:69bc:92:218:8bff:fe40:1470 (fec0:60:69bc:92:218:8bff:fe40:1470), 128 hops max, 80
byte packets
30 fec0:60:69bc:92:218:8bff:fe40:1470 (fec0:60:69bc:92:218:8bff:fe40:1470) 2.145 ms 2.118 ms 2.085
ms
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# track (VRRP)

Enables VRRP tracking for a specified interface. VRRP Extended (VRRP-E) sessions can track a specified interface or a network.

## Syntax

```
track { ethernet slot/port | port-channel number } [ priority value ]
track network { ip-address/mask | ipv6-address/mask } [ priority value ]
no track { ethernet slot/port | port-channel number } [ priority value ]
no track network { ip-address/mask | ipv6-address/mask } [ priority value ]
```

## Command Default

The default priority value is 2.

## Parameters

### **ethernet** *slot port*

Specifies a valid, physical Ethernet subtype with appropriate slot and port number.

### **port-channel** *number*

Specifies the port-channel number. Valid values range from 1 through 6144.

### **priority** *value*

The track priority is a number from 1 through 254, and is used when a tracked interface or network up or down event is detected. For VRRP, if the tracked interface goes offline, the specified priority value is subtracted from the priority of the current device. For VRRP-E, if the tracked interface or network goes offline, the current device priority is reduced by the configured priority value. If the tracked interface or network comes online, the specified priority value is added to the priority of the current device.

### *network*

Enables tracking of a specified network. Network tracking is supported only on VRRP-E sessions.

### *ip-address*

Specifies an IPv4 network address.

### *ipv6-address*

Specifies an IPv6 network address.

### *mask*

Specifies a mask for the associated IP or IPv6 subnet.

## Modes

Virtual-router-group configuration mode

## Usage Guidelines

This command can be used to track interfaces for VRRP or VRRP-E. Only VRRP-E sessions support network tracking.

For VRRP, the tracked interface can be any Ethernet or port-channel interface other than the one on which this command is issued.

The networks to be tracked can be either present or absent from the Routing Information Base (RIB).

The maximum number of interfaces or networks you can track per virtual router is 16.

Enter **no track** with the specified interface or network to remove the tracked port or tracked network configuration.

## Examples

To set the track port to 2/4 and the track priority to 60:

```
device# configure terminal
device(config)# protocol vrrp
device(config)# interface ethernet 1/6
device(conf-if-eth-1/6)# vrrp-group 1
device(config-vrrp-group-1)# track ethernet 2/4 priority 60
```

The following example shows how to configure network 10.1.1.0/24 to be tracked, and if the network goes down, the VRRP-E device priority is lowered by a value of 20. The lower priority may trigger a switchover and a backup device with a higher priority becomes the new master for VRRP-E group 1.

```
device# configure terminal
device(config)# protocol vrrp-extended
device(config)# interface ve 100
device(conf-if-Ve-100)# vrrp-extended-group 1
device(config-vrrp-extended-group-1)# track network 10.1.1.0/24 priority 20
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# traffic-engineering

When an MPLS-enabled device receives an IS-IS TE LSP, it stores the traffic engineering information in its Traffic Engineering database (TED). The device uses information in the TED when performing calculations to determine a path for an LSP. The user can configure the device to send out IS-IS TE LSPs for all of its MPLS-enabled interfaces.

## Syntax

```
traffic-engineering { [ isis [ level-1 | level-2 ] ] [ ospf [ area [ area_id | all ] ] ] }
no traffic-engineering { [ isis [ level-1 | level-2 ] ] [ ospf [ area [ area_id | all ] ] ] }
```

## Command Default

By default, the device does not send out IS-IS LSPs with TE extensions for its MPLS-enabled interfaces.

## Parameters

### isis

Advertise by way of ISIS.

#### level-1

Traffic-engineering for level-1.

#### level-2

Traffic-engineering for level-2.

### ospf

Advertise by way of OSPF.

#### area

designate OSPF area.

#### area\_id

Specifies OSPF area ID in IP address format.

#### all

Advertise in all OSPF areas.

## Modes

MPLS policy mode.

## Usage Guidelines

The no for of the command disables the configuration.

The user must enable the device to send out IS-IS LSPs with TE extensions when the user wants CSPF to perform constraint-based path selection because information in the TED is used to make path selections using CSPF, and information in the TED comes from IS-IS LSPs with TE extensions.

## Examples

The following example configures the device to send out IS-IS TE LSPs to the level-1 MPLS-enabled interface.

```
device# configure
device(config)# router mpls
device(config-router-mpls)# policy
device(config-router-mpls-policy)# traffic-engineering isis level-1
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# traffic-engineering (LSP)

Allocating bandwidth to an LSP lets the LSRs determine how much bandwidth the LSP can consume and how much of the available bandwidth resources can be advertised.

## Syntax

```
traffic-engineering { [[ max-burst kbps ]][ max-rate kbps ]][ mean-rate kbps ]}
no traffic-engineering { [[ max-burst kbps ]][ max-rate kbps ]][ mean-rate kbps ]}
```

## Command Default

There are no allocated bandwidth allocations in the default mode.

## Parameters

**max-burst** *kbps*

Specifies the maximum burst rate in bytes. The range is from 0-2147483647.

**max-rate** *kbps*

Specifies the maximum rate in kbps. The range is from 0-2147483647.

**mean-rate** *kbps*

Specifies the average rate in kbps. The range is from 0-2147483647.

## Modes

MPLS LSP configuration mode (*config-router-mpls-lsp-lsp\_name*).

MPLS router MPLS interface dynamic bypass configuration mode (*config-router-mpls-if-ethernet-slot/port-dynamic-bypass*)

## Usage Guidelines

The user can specify an average mean-rate kbps for the data on the LSP. When necessary, data can travel at max-rate Kbps, as long as the burst sent at the maximum rate contains no more than max-burst bytes.

Use the **traffic-engineering** command to configure bandwidth parameters for the dynamic bypass LSPs to be created for the MPLS protected interface.

When the interface mode **mean-rate** value not configured at all then all dynamic bypass LSPs are created with the bandwidth the same as the backup path requested bandwidth. This means that system tries to create a dynamic bypass LSP with the backup path requested bandwidth and the dynamic bypass LSP bandwidths can vary based on the backup riding on it.

When the interface mode configured mean-rate value is 0 kbps, then the system creates dynamic bypasses for backup bandwidth requests of only 0 kbps. When the backup path bandwidth is more than zero, then this request does not create a new dynamic bypass LSP. This option provides a way to the user to limit the dynamic bypass creations to only non-bandwidth protected backups.

When the interface mode configured mean-rate value is a non-zero value, then the system does not create dynamic bypasses for the backups which request backup bandwidth that is more than the interface mode configured value. When the backup bandwidth is less than, or equal to the configured value, then the request is used to ride an existing dynamic bypass or to create

a new dynamic bypass. With this configuration, all the newly created dynamic bypasses have a fixed bandwidth, meaning the value is same as the interface mode user configured non-zero mean-rate value.

A mean-rate value that is more than the current interface reservable bandwidth is not desired. Configuration succeeds with the new value even when it is more than the interface reservable bandwidth.

The **no** form of the command removes the traffic-engineering options.

## Examples

The following example configures the maximum rate of packets that can go through LSP *tunnel1* (in Kbps).

```
device# configure
device(config)# router mpls
device(config-router-mpls)# lsp tunnel1
device(config-router-mpls-lsp-tunnel1)# traffic-eng max-rate 20
```

The following example configures the average rate of packets that can go through LSP *tunnel1* (in Kbps).

```
device# configure
device(config)# router mpls
device(config-router-mpls)# lsp tunnel1
device(config-router-mpls-lsp-tunnel1)# traffic-eng mean-rate 10
```

The following example configures the maximum size (in bytes) of the largest burst LSP *tunnel1* can send at the maximum rate.

```
device# configure
device(config)# router mpls
device(config-router-mpls)# lsp tunnel1
device(config-router-mpls-lsp-tunnel1)# traffic-eng max-burst 10
```

The following example configures the traffic-engineering maximum rate to 1000000 kbps. for dynamic bypass MPLS Ethernet interface *2/8*.

```
device# configure
device(config)# router mpls
device(config-router-mpls)# mpls-interface ethernet 2/8
device(config-router-mpls-if-ethernet-2/8)# dynamic-bypass
device(config-router-mpls-if-ethernet-2/8-dynamic-bypass)# traffic-eng max-rate 1000000
```

## History

Release version	Command history
16r.1.00	This command was introduced.
17r.1.00	This command was modifies to include MPLS dynamic bypass information.

# transit-session-accounting

Enables traffic statistics for transit sessions.

## Syntax

`transit-session-accounting`

`no transit-session-accounting`

## Command Default

By default, the command is disabled.

## Modes

MPLS policy mode.

## Usage Guidelines

Use the **no** form of the command disables the traffic statistics for transit sessions.

## Examples

The following example enables transit session accounting.

```
device# configure
device(config)# router mpls
device(config-router-mpls)# policy
device(config-router-mpls-policy) transit-session-accounting
```

## History

Release version	Command history
16r.1.01	This command was introduced.

# trigger

Defines event-handler triggers. When the trigger-condition occurs, a Python script is run.

## Syntax

```
trigger trigger-id raslog raslog-id [ pattern posix-ext-regex ]
no trigger [ trigger-id ]
```

## Command Default

No trigger is defined.

## Parameters

*trigger-id*

Specifies an ID number for the trigger. Valid values are 1 through 100, and must be unique per event-handler profile.

raslog *raslog-id*

Specifies a RASlog message ID as the trigger.

pattern *posix-ext-regex*

Specifies a POSIX extended regular expression to search within the specified RASlog message ID.

## Modes

Event-handler configuration mode

## Usage Guidelines

You can create from 1 through 100 triggers per profile.

You can also define one trigger as part of the **event-handler** command.

To delete one or all triggers, use the **no** form of this command, as follows:

- To delete all triggers, enter **no trigger**.
- To delete a specific trigger, enter **no trigger *trigger-id***

### NOTE

You cannot delete the last remaining trigger from an activated event-handler profile.

You can modify an existing trigger without deleting it and then re-creating it.

If the event-handler for which you are modifying triggers is active on the device, the changes take effect with no need to de-activate and re-activate the event-handler.

A Python event-handler script runs only if all of the following occur:

- Using the **copy** command, copy the Python file to the `flash://` location on the device.
- Using the **event-handler** command, create an event-handler profile.

- In configuration mode for that profile:
  - Using the **trigger** command, create one or more triggers.
  - Using the **action** command, specify the Python script that will be triggered.
- Using the **event-handler activate** command, activate an instance of the event handler.
- The trigger event occurs.

## Examples

The following example defines triggers in two event handlers.

```
device# configure terminal
device(config)# event-handler eventHandler2
device(config-event-handler-eventHandler2)# trigger 1 raslog NSM-1001
device(config-event-handler-eventHandler2)# trigger 2 raslog NSM-1003
```

The following example defines a trigger that uses POSIX extended REGEX to search for a match within a specified RASlog message ID.

```
device# configure terminal
device(config-event-handler-eventHandler1)# event-handler eventHandler2
device(config-event-handler-eventHandler2)# trigger 1 raslog NSM-1003 pattern Interface Ethernet 1/[1-9] is link down
```

RASlog message NSM-1003 includes "**interface** *interface-name* is link down", indicating that an interface is offline because the link is down. The REGEX searches within such a message for an interface from 1/1 through 1/9.

## History

Release version	Command history
16r.1.00	This command was introduced.
17r.1.00	The command was modified to support POSIX extended regular expressions to search in a specified RASlog message ID.

# trigger-function

For an implementation of an event-handler profile, if multiple triggers are defined for an event-handler action, specifies if the action runs only if all of the triggers occur; or if one is sufficient.

## Syntax

```
trigger-function { OR | AND { time-window seconds } }
```

```
no trigger-function
```

## Command Default

The event-handler action runs if any of the triggers occur.

## Parameters

**OR**

The event-handler action runs if any of the triggers occur.

**AND**

The event-handler action runs only if all of the triggers occur.

**time-window seconds**

In seconds, specify the time window within which all of the triggers must occur in order that the event-handler action runs.

Following an initial triggering of an event-handler action, any subsequent trigger launches the action an additional time if the following conditions are true:

- The **trigger-mode** parameter is set to the default **each-instance**.
- The subsequent trigger occurs within the specified **time-window**.

## Modes

Event-handler activation mode

## Usage Guidelines

The **no** form of this command sets the **trigger-function** setting to the default **OR** option.

## Examples

The following example determines that the event-handler action runs only if all of the triggers occur within 120 seconds.

```
device# configure terminal
device(config)# event-handler activate eventHandler1
device(config-activate-eventHandler1)# trigger-function AND time-window 120
```



The following example resets **trigger-function** to the default **OR** option.

```
device# configure terminal
device(config)# event-handler activate eventHandler1
device(config-activate-eventHandler1)# no trigger-function
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# trigger-mode

For an implementation of an event-handler profile, specifies if recurring trigger conditions can launch an event-handler action more than once.

## Syntax

`trigger-mode mode`

`no trigger-mode`

## Command Default

Each time the trigger condition occurs, the event-handler action is launched.

## Parameters

*mode*

Specifies if an event-handler action can be triggered only once or more than once.

**each-instance**

The event-handler action is launched on each trigger instance received.

**on-first-instance**

As long as the device is running, the event-handler action is launched only once. Following a device restart, the event-handler action can be triggered again.

**only-once**

For the duration of a device configuration, the event-handler action is launched only once.

## Modes

Event-handler activation mode

## Usage Guidelines

The `no` form of this command resets the `trigger-mode` setting to the default `each-instance` option.

## Examples

The following example sets the trigger mode to **on-first-instance**.

```
device# configure terminal
device(config)# event-handler activate eventHandler1
device(config-activate-eventHandler1)# trigger-mode on-first-instance
```

The following example resets **trigger-mode** to the default value of **each-instance**.

```
device# configure terminal
device(config)# event-handler activate eventHandler1
device(config-activate-eventHandler1)# no trigger-mode
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# ttl

Configures the time to live (TTL) value for a tunnel interface.

## Syntax

**ttl** *ttl-value*

**no ttl**

## Parameters

*ttl-value*

Specifies the TTL value. The range is from 1 to 255.

## Command Default

The default TTL value is 255.

## Modes

Interface tunnel configuration mode

## Usage Guidelines

Use the **no** form of this command to revert to the default value.

## Examples

This example configures the TTL value for the tunnel interface.

```
device# configure terminal
device (config)# interface tunnel 5
device(config-intf-tunnel-5)# mode gre ip
device(config-intf-tunnel-5)# source 10.1.1.10
device(config-intf-tunnel-5)# source ve 4
device(config-intf-tunnel-5)# destination 10.1.1.11
device(config-intf-tunnel-5)# router-interface ve 3
device(config-intf-tunnel-5)# dscp-ttl-mode pipe
device(config-intf-tunnel-5)# ttl 64
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# tunable-optics

This command assigns channels to tunable optic interfaces (T-SFP+) for specific wavelengths.

## Syntax

```
tunable-optics sfpp channel channel_number
```

## Command Default

The T-SFP+ optic defaults to a "no wavelength" state before being activated.

## Modes

Interface configuration mode

## Usage Guidelines

Tunable SFP+ optics are optional hardware that can be installed in the linecards with optical SFPs.

If you are installing a T-SFP+ in a 144S port, the T-SFP+ optic needs to be installed in both ends of the cable. The T-SFP+ at each end of the cable link must be configured at the same wavelength by setting them to the same channel on each device.

Failure to duplicate the channel setting may allow the link to come online, but the link behavior may be erratic.

If the firmware determines an error is exceeding a specified limit, a RASLOG message event occurs and the port is taken offline.

The T-SFP+ interface defaults to a "no wavelength" state. When a supported Extreme device boots, the firmware sets the desired wavelength of the T-SFP+ optic.

When a T-SFP+ interface is installed it is very important that the interface is configured to the same channel (wavelength) at both ends. Use the **show media tunable-optic-sfpp** command to determine the currently configured channel.

T-SFP+ interfaces are tuned to specific wavelengths and frequencies using pre-defined channels.

Refer to the *Extreme SLX-OS Monitoring Configuration Guide* for complete information on tunable optics.

The following tables lists the frequency and wavelength assigned to channels for tunable SFP+ optic interfaces.

**TABLE 8** Supported wavelengths and channel numbers

Channel	Frequency (THz)	Wavelength (nm)
1	191.10	1568.77
2	191.15	1568.36
3	191.20	1567.95
4	191.25	1567.54
5	191.30	1567.13
6	191.35	1566.72
7	191.40	1566.31
8	191.45	1565.90
9	191.50	1565.50
10	191.55	1565.09

**TABLE 8** Supported wavelengths and channel numbers (continued)

Channel	Frequency (THz)	Wavelength (nm)
11	191.60	1564.68
12	191.65	1564.27
13	191.70	1563.86
14	191.75	1563.45
15	191.80	1563.05
16	191.85	1562.64
17	191.90	1562.23
18	191.95	1561.83
19	192.00	1561.42
20	192.05	1561.01
21	192.10	1560.61
22	192.15	1560.20
23	192.20	1559.79
24	192.25	1559.39
25	192.30	1558.98
26	192.35	1558.58
27	192.40	1558.17
28	192.45	1557.77
29	192.50	1557.36
30	192.55	1556.96
31	192.60	1556.55
32	192.65	1556.15
33	192.70	1555.75
34	192.75	1555.34
35	192.80	1554.94
36	192.85	1554.54
37	192.90	1554.13
38	192.95	1553.73
39	193.00	1553.33
40	193.05	1552.93
41	193.10	1552.52
42	193.15	1552.12
43	193.20	1551.71
44	193.25	1551.32
45	193.30	1550.92
46	193.35	1550.52
47	193.40	1550.12
48	193.45	1549.72
49	193.50	1549.32
50	193.55	1548.91
51	193.60	1548.51

**TABLE 8** Supported wavelengths and channel numbers (continued)

Channel	Frequency (THz)	Wavelength (nm)
52	193.65	1548.11
53	193.70	1547.72
54	193.75	1547.32
55	193.80	1546.92
56	193.85	1546.52
57	193.90	1546.12
58	193.95	1545.72
59	194.00	1545.32
60	194.05	1544.92
61	194.10	1544.53
62	194.15	1544.13
63	194.20	1543.73
64	194.25	1543.33
65	194.30	1542.94
66	194.35	1542.54
67	194.40	1542.14
68	194.45	1541.75
69	194.50	1541.35
70	194.55	1540.95
71	194.60	1540.56
72	194.65	1540.16
73	194.70	1539.77
74	194.75	1539.37
75	194.80	1538.98
76	194.85	1538.58
77	194.90	1538.19
78	194.95	1537.79
79	195.00	1537.40
80	195.05	1537.00
81	195.10	1536.61
82	195.15	1536.22
83	195.20	1535.82
84	195.25	1535.43
85	195.30	1535.04
86	195.35	1534.64
87	195.40	1534.25
88	195.45	1533.86
89	195.50	1533.47
90	195.55	1533.07
91	195.60	1532.68
92	195.65	1532.29

**TABLE 8** Supported wavelengths and channel numbers (continued)

Channel	Frequency (THz)	Wavelength (nm)
93	195.70	1531.90
94	195.75	1531.51
95	195.80	1531.12
96	195.85	1530.72
97	195.90	1530.33
98	195.95	1529.94
99	196.00	1529.55
100	196.05	1529.16
101	196.10	1528.77
102	196.15	1528.38

## Examples

Typical command example.

```
device# configure terminal
device(config)# interface ethernet 0/1
device(conf-if-eth-0/1)# tunable-optics sfpp channel 5
device(conf-if-eth-0/1)# do show media optical-monitoring
N/A - Not Available.
N/S - Optical-monitoring Not Supported.
```

Port	Module Temperature ( C )	Supply Voltage ( mVolts )	Channel TX Power ( uWatts )	Frequency Error ( GHz )	Wavelength Error ( nm )	Bias Current ( mAmps )	Channel RX Power ( uWatts )
Eth 0/1	36	3291.6	694.4	0.0	0.000	38.550	748.8
Eth 0/24			N/S				
Eth 0/32	33	3317.1	685.1	0.0	0.000	37.132	914.5
Eth 0/48			N/S				

## History

Release version	Command history
17r.1.00	This command was introduced.



# tx-frame-count

Configures the transmission frame count.

## Syntax

**tx-frame-count** *frame-count*

**no tx-frame-count**

## Parameters:

*frame-count*

Specifies the transmission frame count. The range is from 1 to 1000.

## Command Default

The default value for tx-frame-count is 10 .

## Modes

Y1731 configuration mode

## Usage Guidelines

Use the **no** form of the command to delete the transmission frame count configuration.

## Examples

This example shows how to configure the transmission frame count.

```
device# configure terminal
device (config-cfm)# protocol cfm
device (config-cfm)# y1731
device(config-cfm-y1731)# test-profile my_test_profile
device(config-cfm-y1731-test-profile-my_test_profile)# type delay-measurement
device(config-cfm-y1731-test-profile-my_test_profile)# tx-interval 60
device(config-cfm-y1731-test-profile-my_test_profile)# measurement-interval 30
device(config-cfm-y1731-test-profile-my_test_profile)# start at 00:00:00 daily
device(config-cfm-y1731-test-profile-my_test_profile)# stop at 23:59:00
device(config-cfm-y1731-test-profile-my_test_profile)# cos 7
device(config-cfm-y1731-test-profile-my_test_profile)# threshold maximum 3294967295
device(config-cfm-y1731-test-profile-my_test_profile)# tx-frame-count 300
```

## History

Release version	Command history
17r.1.01	This command was introduced.

# tx-interval

Configures the transmission interval.

## Syntax

**tx-interval** *tx-interval*  
**no tx-interval**

## Parameters:

*tx-interval*  
 Specifies the transmission interval in seconds. Valid values can be 1, 10, 60, or 600 seconds.

## Command Default

The default value for tx interval is 1 second.

## Modes

Y1731 configuration mode

## Usage Guidelines

Use the **no** form of the command to delete the transmission interval configuration.

## Examples

This example shows how to configure the transmission interval.

```
configure terminal
device (config-cfm)# protocol cfm
device (config-cfm)# y1731
device(config-cfm-y1731)# test-profile my_test_profile
device(config-cfm-y1731-test-profile-my_test_profile)# type delay-measurement
device(config-cfm-y1731-test-profile-my_test_profile)# tx-interval 60
```

## History

Release version	Command history
17r.1.01	This command was introduced.

# tx-label-silence-timer

Sets the length of the EOL transmit label silence timer for LDP-IGP synchronization.

## Syntax

**tx-label-silence-timer** *milliseconds*

**no tx-label-silence-timer**

## Command Default

The default value is 1000 milliseconds.

## Parameters

*milliseconds*

Specifies the EOL transmit label silence timer in milliseconds. Enter an integer from 100 to 60000.

## Modes

MPLS LDP EOL configuration mode

## Usage Guidelines

Use the **no** form of the resets the default value of 1000 milliseconds.

## Examples

The following example sets the length of time for the EOL transmit label silence timer to 2000 milliseconds.

```
device(config)# router mpls
device(config-router-mpls)# ldp
device(config-router-mpls-ldp)# eol
device(config-router-mpls-ldp-eol)# tx-label-silence-timer 2000
```

## History

Release version	Command history
16r.1.00	This command was introduced.

## type

Configure a profile type as ETH-DM or ETH-SLM.

## Syntax

```
type [ delay-measurement | synthetic-loss-measurement ]
```

## Parameters:

### delay-measurement

Specifies the profile type as delay management.

### synthetic-loss-measurement

Specifies the profile type as synthetic loss measurement.

## Modes

Y.1731 configuration mode

## Examples

This example shows how to configure the profile type as delay measurement or as synthetic loss measurement .

```
device# configure terminal
device (config-cfm)# protocol cfm
device (config-cfm)# y1731
device(config-cfm-y1731)# test-profile my_test_profile
device(config-cfm-y1731-test-profile-my_test_profile)# type delay-measurement

device# configure terminal
device (config-cfm)# protocol cfm
device (config-cfm)# y1731
device(config-cfm-y1731)# test-profile my_test_profile
device(config-cfm-y1731-test-profile-my_test_profile)# type synthetic-loss-measurement
```

## History

Release version	Command history
17r.1.01	This command was introduced.

# type layer2-extension

Specifies that a VXLAN overlay gateway uses the Layer 2 extension.

## Syntax

```
type layer2-extension
```

## Modes

VXLAN overlay gateway configuration mode

## Usage Guidelines

There is no **no** form of this command.

## Examples

The following example specifies the Layer 2 extension:

```
device# configure terminal
device(config)# overlay-gateway gateway1
device(config-overlay-gw-gateway1)# type layer2-extension
```

## History

Release version	Command history
17r.1.00	This command was introduced.
17r.1.01	Added bridge domain consideration information. Removed <b>hardware-vtep</b> keyword because it is not supported.

# udld enable

Enables the Unidirectional Link Detection (UDLD) protocol on an interface.

## Syntax

`udld enable`  
`no udld enable`

## Command Default

Disabled on interfaces by default.

## Modes

Interface configuration mode

## Usage Guidelines

Use **no udld enable** to unblock the interface if it has been blocked by the UDLD protocol.

## Examples

To enable UDLD on a specific ethernet interface:

```
device# configure terminal
deviceconfig# interface te 5/1
device(conf-if-eth-5/1)# udld enable
```

# underflow-limit

Sets the underflow-limit to the input value.

## Syntax

```
underflow-limit { value }
```

```
no underflow-limit
```

## Command Default

The default is set to zero (0), meaning there is no premature adjustment because of underflow.

## Parameters

*value*

The selected number of consecutive samples which have to be below the threshold to trigger a premature adjustment.

## Modes

MPLS sub-configuration modes

```
config-mpls-autobw-template-template1
```

```
config-mpls-lsp-lsp1
```

## Usage Guidelines

The **no** function of the command sets the underflow-limit back to the default value.

## Examples

The following example configures the underflow-limit in auto-bandwidth template1 to 10.

```
device>configure
device(config)# router mpls
device(config-router-mpls)# autobw-template template1
device(config-router-mpls-autobw-template-template1)# underflow-limit 10
```

The following example configures the underflow-limit for LSP1 to 10.

```
device>configure
device(config)# router mpls
device(config-router-mpls)# lsp lsp1
device(config-router-mpls-lsp-lsp1)# autobw
device(config-router-mpls-lsp-lsp1-autobw)# underflow-limit 10
```

## History

Release version	Command history
17r.1.00	This command was introduced.



# unlock username

Unlocks a locked user account.

## Syntax

```
unlock username name
```

## Parameters

*name*

Specifies the name of the user account.

## Modes

Privileged EXEC mode

## Usage Guidelines

Use this command to unlock a user who has been locked out because of unsuccessful login attempts. A user account is locked by the system when the configured threshold for login retries has been reached.

## Examples

The following example unlocks a user account.

```
device# unlock username testUser  
Result: Unlocking the user account is successful
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# update-time

Configures the interval at which BGP next-hop tables are modified. BGP next-hop tables should always have IGP (non-BGP) routes.

## Syntax

```
update-time sec
```

```
no update-time sec
```

## Command Default

This option is disabled.

## Parameters

sec

Update time in seconds. Range is from 0 through 30. Default is 5 seconds.

## Modes

BGP address-family IPv4 unicast configuration mode

BGP address-family IPv6 unicast configuration mode

BGP address-family IPv4 unicast VRF configuration mode

BGP address-family IPv6 unicast VRF configuration mode

## Usage Guidelines

Use the **no** form of this command to restore the defaults.

The update time determines how often the device computes the routes (next-hops). Lowering the value set by the **update-time** command increases the convergence rate.

By default, the device updates the BGP4 next-hop tables and affected BGP4 routes five seconds following IGP route changes. Setting the update time value to 0 permits fast BGP4 convergence for situations such as a link failure or IGP route changes, starting the BGP4 route calculation in subsecond time.

### NOTE

Use the **advertisement-interval** command to determine how often to advertise IGP routes to the BGP neighbor.

## Examples

This example sets the BGP4+ update-time interval to 30.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family ipv6 unicast vrf red
device(config-bgp-ipv6u-vrf)# update-time 30
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# usb

Enables or disables an attached USB device. The device is inaccessible until it is enabled.

## Syntax

```
usb { on | off }
```

## Parameters

**on**

Turns the USB device on.

**off**

Turns the USB device off.

## Modes

Privileged EXEC mode

## Usage Guidelines

This command is executed on the local device. A device reload automatically turns the USB device off.

This command is supported only on the local device.

## Examples

To enable a USB device attached to the local device:

```
device# usb on
USB storage enabled
```

To disable a USB device attached to the local device:

```
device# usb off
USB storage disabled
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# usb dir

Lists the contents of an attached USB device.

## Syntax

`usb dir`

## Modes

Privileged EXEC mode

## Usage Guidelines

This command is executed on the local device. The USB device must be enabled before this function is available.

This command is supported only on the local device.

## Examples

To list the contents of the USB device attached to the local device:

```
device# usb dir
firmwarekey\ 0B 2016 Aug 15 15:13
support\ 106MB 2016 Aug 24 05:36
support1034\ 105MB 2016 Aug 23 06:11
config\ 0B 2016 Aug 15 15:13
firmware\ 380MB 2016 Aug 15 15:13
Available space on usbstorage 74%
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# usb remove

Removes a file from an attached USB device.

## Syntax

```
usb remove directory directory file file
```

## Parameters

**directory** *directory*

Specifies one the name of the directory where the file you want to remove is located. Valid USBstorage directories are /firmware, /firmwarekey, /support, and /config.

**file** *file*

Specifies the name of the file to be removed.

## Modes

Privileged EXEC mode

## Usage Guidelines

This command is executed on the local device. The USB device must be enabled before this function is available.

This command is supported only on the local device.

## Examples

To remove a configuration file from a USB device attached to the local device:

```
device# usb remove directory config file startup-config.backup
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# use-v2-checksum

Enables the v2 checksum computation method for a VRRPv3 IPv4 session.

## Syntax

```
use-v2-checksum
no use-v2-checksum
```

## Command Default

VRRPv3 uses the v3 checksum computation method.

## Modes

Virtual-router-group configuration mode

## Usage Guidelines

Some non-Extreme devices only use the v2 checksum computation method in VRRPv3. This command enables v2 checksum computation method in VRRPv3 and provides interoperability with these non-Extreme devices.

The **no** form of this command enables the default v3 checksum computation method in VRRPv3 sessions.

## Examples

The following example shows the v2 checksum computation method enabled for an VRRPv3 IPv4 session on an Extreme device.

```
device(config)# protocol vrrp
device(config)# interface ve 100
device(config-Ve-100)# vrrp-group 10 version 3
device(config-vrrp-group-10)# use-v2-checksum
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# user (alias configuration)

Launches the user-level alias configuration mode, in which you can manage user aliases.

## Syntax

**user** *username*

**no user** *username*

## Parameters

*username*

Specifies the account login name.

## Modes

Alias configuration mode

## Usage Guidelines

To delete all aliases defined for a specified user, enter the **no** form of this command.

## Examples

The following example accesses user-alias configuration mode for the user `jdoe`, and defines a user-level alias named "sv" for the **show version** command.

```
device# configure terminal
device(config)# alias-config
device(config-alias-config)# user jdoe
device(config-user-jdoe)# alias sv "show version"
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# username

Creates and configures a user account.

## Syntax

```
username username password password role role_name [ access-time HHMM to HHMM ] [ desc description ] [ enable { true | false } ] [ encryption-level { 0 | 7 } ] [ expire { never | YYYY-MM-DD } ]
```

```
no username name
```

## Parameters

*username*

Specifies the account login name.

**access-time** *HHMM to HHMM*

Restricts the hours during the day that the user may be logged in. Valid values range from 0000 through 2400. By default, users are granted 24 hour access. Use 24-hour format. For example, to restrict access to the daily work schedule, use **access-time 0800 to 1800**. By default, there is no access-time limitation. To change access time, include both the new "from" time and "to" time. To restore default access time, specify **access-time 0000 to 2400**.

**desc** *description*

Specifies a description of the account (optional). The description can be up to 64 characters long, and can include any printable ASCII character, except for the following characters: single quotation marks ('), double quotation marks ("), exclamation point (!), colon (:), and semi-colon (;). If the description contains spaces, enclose the text in double quotation marks.

**enable**

Enables or disables the account.

**true**

(Default) Enables the account.

**false**

Disables the account. A user whose account is disabled cannot log in.

**expire**

Specifies the password expiration setting.

**never**

(Default) Does not specify a password expiration date.

*YYYY-MM-DD*

Specifies a password expiration date.

**password** *password*

Specifies the account password. To use the exclamation mark (!) character, either precede it with the escape character (\)—**secret!\password**—or enclose the password within double quotes—**"secret!password"**.

**role** *role\_name*

Specifies the role assigned to the username account.

**encryption-level { 0 | 7 }**

Specifies the password encryption level. The values are 0 (clear text) and 7 (encrypted). Clear text (0) is the default. If service password-encryption is enabled, it overrides a user-level setting.

## Modes

Global configuration mode

## Usage Guidelines

The *username* must be from 1 through 40 characters. It must begin with a letter or underscore and be comprised of only letters, numbers, underscore and period. A username is case sensitive. It cannot be the same as that of an existing role.

When creating a username, you must specify a password and a role. When modifying a username, it is sufficient to enter **username** *username* , followed by the new values.

The maximum number of user accounts on a device is 64.

If a user's password, access time, or role is changed, any login sessions for that user are terminated.

To specify **access-time**, use the system time defined for the Extreme operating system. For the current system time, enter **show clock**.

To delete a user, enter the **no username** *username* command.

## Examples

The following example configures a user account.

```
device# configure terminal
device(config)# username testUser password ***** role user desc
```

The following example modifies an existing user account.

```
device# configure terminal
device(config)# username testUser desc "add op test user"
```

The following example modifies an existing user account, restricting the hours that an existing user may be logged in from 08:00 AM through 18:00 PM.

```
device# configure terminal
device(config)# username testUser access-time 0800 to 1800
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# vc-id

Configures a virtual connection identifier (VC ID) for a bridge domain.

## Syntax

```
vc-id id
no vc-id
```

## Command Default

A virtual connection identifier is not configured.

## Parameters

*id*  
Specifies a virtual connection identifier. The range is from 1 through 4294967295.

## Modes

Bridge-domain configuration mode.

## Usage Guidelines

For VLL, the VC ID is the VLL cross-connection instance ID.

For VPLS, the VC ID is the virtual switch instance ID.

Once a VC ID is configured for a VPLS bridge domain, it is used for all configured pseudowires (circuit emulation services).

The **no** form of the command removes the VC ID configuration.

## Examples

The following example shows how to configure a VC ID (5) for bridge domain 4.

```
device# configure terminal
device(config)# bridge-domain 4
device(config-bridge-domain-4)# vc-id 5
```

## History

Release version	Command history
16r.1.00	This command was introduced.

## vc-mode

Configures the virtual connection (VC) mode for a pseudowire (PW) profile.

### Syntax

```
vc-mode { raw | raw-passthrough | tag }
no vc-mode
```

### Command Default

The default VC mode is **raw**.

### Parameters

#### raw

Specifies using raw mode. At VC label imposition, when a tagged packet is received on a tagged AC endpoint, the VLAN tag is removed before it is sent out on the wire. When an untagged packet is received on an untagged AC endpoint it is encapsulated as is and sent out on the wire.

#### raw-passthrough

Specifies using raw-passthrough mode which enables interoperation with third-party devices. When all endpoints are configured as tagged endpoints, raw passthrough mode behaves the same way as tagged mode. When all endpoints are configured as untagged endpoints, raw-passthrough mode behaves the same way as raw mode. Select the **raw-passthrough** option, when all endpoints are configured as untagged endpoints (even when peer devices signal the PW VC mode as raw).

#### tag

Specifies using tag mode. At VC label imposition, when a tagged packet is received on a tagged AC endpoint, the packet is encapsulated as is and sent out on the wire. When an untagged packet is received on an untagged AC endpoint, a dummy tag is added and it is sent out on the wire.

### Modes

Pseudowire-profile configuration mode.

### Usage Guidelines

The **no** form of the command restores the default value.

### Examples

The following example shows how to set the VC mode to **raw-passthrough** for a PW profile named test.

```
device# configure terminal
device(config)# pw-profile test
device(config-pw-profile-test)# vc-mode raw-passthrough
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# virtual-ip

Configures a virtual IPv4 address or IPv6 address for the virtual router.

## Syntax

```
virtual-ip { ipv4-address | ipv6-address }
```

```
no virtual-ip { ipv4-address | ipv6-address }
```

## Parameters

*ipv4-address*

Virtual IPv4 address of the virtual router.

*ipv6-address*

Virtual IPv6 address of the virtual router.

## Modes

Virtual-router-group configuration mode

## Usage Guidelines

The virtual IPv4 address or IPv6 address is the IP address that an end-host sets as its default gateway. The virtual IP address must belong to the same subnet as the underlying interface. A maximum of 16 virtual IP addresses can be configured for VRRP; only one virtual IP address can be configured for VRRP-E. The session is enabled as soon as the first virtual IP address is configured.

You can perform this command for VRRP or VRRP-E. VRRPv3 introduced the ability to use an IPv6 address when an IPv6 VRRPv3 group is configured.

This command accepts both fe80/10 link local addresses or fe80/64 addresses as virtual-IP.

Enter the **no virtual-ip** command with a specified virtual IP address to delete the specified virtual IP address

## Examples

To assign a virtual IP address of 192.53.5.1 to the VRRP virtual group 1:

```
device(config)# protocol vrrp
device(config)# interface ethernet 1/6
device(conf-if-eth-1/6)# vrrp-group 1
device(config-vrrp-group-1)# virtual-ip 192.53.5.1
```

To assign a virtual IP address of 192.53.5.1 to the VRRP-E virtual group 1:

```
device(config)# protocol vrrp
device(config)# interface ve 20
device(config-ve-20)# vrrp-group-extended 1
device(config-vrrp-extended-group-1)# virtual-ip 192.53.5.1
```

To assign a virtual IPv6 address of 2001:2019:8192::1 to the VRRP-Ev3 virtual group 19:

```
device(config)# ipv6 protocol vrrp-extended
device(config)# interface ve 2019
device(config-ve-2019)# ipv6 address 2001:2019:8192::122/64
device(config-ve-2019)# ipv6 vrrp-extended-group 19
device(config-vrrp-extended-group-19)# virtual-ip 2001:2019:8192::1
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# virtual-mac

Enables generation of a virtual MAC with 0 IP hash.

## Syntax

**virtual-mac** *virtual\_mac\_address*

## Parameters

*virtual\_mac\_address*

Specifies a virtual MAC address.

## Modes

VRRP-Extended group configuration mode

## Usage Guidelines

The distributed VXLAN gateway functionality depends on VRRP-E for multi-homing. By default, the VRRP-E virtual MAC is derived as `02:e0:52:<2-byte-ip-hash>:<1-byte-vid>`. The VXLAN gateway requires that the virtual MAC be a function of only VRID. The two-byte hash of the virtual IP should be set to zeros, for example, `02e0.5200.00xx:100`.

## Examples

To enable the generation of a virtual MAC:

```
device# configure terminal
device(config)# interface ve 10
device(config-Ve-10)# vrrp-extended-group 100
device(config-vrrp-extended-group-100)# virtual-mac 02e0.5200.00xx:100
```

## History

Release version	Command history
16r.1.00	This command was introduced.



# vlan

Specifies a VLAN and enters VLAN configuration mode.

## Syntax

**vlan** *vlan\_id*

**no vlan** *vlan\_id*

## Command Default

No VLAN is configured.

## Parameters

*vlan\_id*

Specifies a VLAN ID. Range is from 1 through 4090.

## Modes

Global configuration mode

## Usage Guidelines

Use the **no** form of this command to delete a VLAN.

## Examples

To configure VLAN 10:

```
device# configure terminal
device(config)# vlan 10
device(config-vlan-10)#
```

## History

Release version	Command history
17r.1.01	This command was introduced.

# vlan (EVPN default instance)

Specifies a VLAN, or adds or removes a range of VLANs, for an Ethernet Virtual Private Network (EVPN) default instance.

## Syntax

**vlan** *VLAN-ID*

**no vlan** *VLAN-ID*

**vlan** { **add** | **remove** } {*VLAN-range*}

## Command Default

Disabled

## Parameters

*VLAN-ID*

Specifies a VLAN.

**add**

Adds a range of VLANs to the default EVPN instance.

**remove**

Removes a range of VLANs from the default EVPN instance.

*VLAN-range*

Specifies a hyphen-delimited VLAN range.

## Modes

EVPN default instance configuration mode

## Usage Guidelines

Each VLAN/BD added to an EVPN configuration is considered as an EVPN instance and is assigned a unique EVPN instance ID (EVI) internally. The EVI is calculated as shown in the following table.

**TABLE 9** Calculating EVI values from VLAN/BD values

VLAN/BD	EVI value
VLAN: 1-4096	VLAN ID
BD: 1-4096	BD ID + 4096

### ATTENTION

To interoperate with third-party vendors, the RTs across the interoperating devices must be the same. If third-party devices do not support automatic RT assignment, or the EVIs are not calculated as shown in the above table, the VLAN/BD instances must be configured manually to ensure that RTs across the devices are compatible.

## Examples

To specify a VLAN and enter VLAN configuration mode:

```
device# configure terminal
device(config)# evpn
device(config-evpn-default)# vlan 100
device(config-vlan-100)#
```

To add VLANs 100 through 200 to the default EVPN instance:

```
device# configure terminal
device(config)# evpn
device(config-evpn-default)# vlan add 100-200
```

To remove VLANs 150 through 180 from the default EVPN instance:

```
device# configure terminal
device(config)# evpn
device(config-evpn-default)# vlan remove 150-180
```

## History

Release version	Command history
17r.1.01	This command was introduced.

# vpn-statistics

Enables VPN statistics for a VRF.

## Syntax

```
vpn-statistics
no vpn-statistics
```

## Command Default

No RD is assigned to the VRF.

## Parameters

*as-num*

Composed of the local ASN number followed by a colon ":" and a unique arbitrary number. For example 3:6.

*ip-num:id*

Composed of the local IP address followed by a colon ":" and a unique arbitrary number.

## Modes

VRF configuration mode

## Usage Guidelines

The **no** form of the command returns to the default setting.

## Examples

The following example shows how to enable VPN statistics for a VRF.

```
device# configure terminal
device(config)# vrf vpn1
device#(config-vrf-vpn1)# rd 1:2
device#(config-vrf-vpn1)# vpn-statistics
```

## History

Release version	Command history
17r.1.01	This command was introduced.

# vrf

Creates a Virtual Routing and Forwarding (VRF) instance and enters VRF configuration mode.

## Syntax

`vrf name`

## Parameters

*name*

Character string for the name of the VRF. The string can be up to 24 characters long, but should not contain punctuation or special characters.

## Modes

Global configuration mode

## Examples

To create the VRF instance "myvrf" and enter VRF configuration mode:

```
device# configure terminal
device(config)# vrf myvrf
device(config-vrf-myvrf)#
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# vrrp-acceptmode-disable

Disables accept mode for the backup Virtual Router Redundancy Protocol (VRRP) virtual IP (VIP).

## Syntax

```
vrrp-acceptmode-disable
no vrrp-acceptmode-disable
```

## Command Default

When configured, accept mode is enabled by default.

## Modes

Global configuration mode

## Usage Guidelines

The **no** form of the command enables accept mode for the backup VRRP VIP.

When enabled, accept mode allows a backup VRRP master device to respond to ping, traceroute, and Telnet packets if it becomes the master VRRP device.

## Examples

The following example shows how to disable accept mode for the backup VRRP VIP.

```
device# configure terminal
device(config)# vrrp-acceptmode-disable
```

## History

Release version	Command history
	This command was introduced.

# vrrp-extended-group

Configures a virtual-router-extended group and enters into the virtual router configuration mode..

## Syntax

```
vrrp-extended-group group-ID
```

```
no vrrp-extended-group group-ID
```

## Parameters

*group-ID*

A user-assigned number from 1 through 255 that you assign to the virtual router group.

## Modes

Virtual Ethernet (ve) interface configuration mode

## Usage Guidelines

This configuration is for virtual Ethernet (ve) interfaces only.

Enter **no vrrp-extended-group** *group-ID* to remove the specific VRRP Extended group.

If you remove a group, you cannot retrieve it. You would have to redo the configuration procedure.

## Examples

The following example shows how to assign the ve interface with a vlan number of 20 to the virtual router extended group with the ID of 1. (First you must enable VRRP-E on the switch.)

```
device(config)# protocol vrrp-extended
device(config)# interface ve 20
device(config-ve-20)# vrrp-extended-group 1
```

## History

Release version	Command history
16r.1.00	This command was introduced.

## vrrp-group

Configures a virtual router group (VRRP) and enters into the virtual router configuration mode.

### Syntax

```
vrrp-group group-ID [ version { 2 | 3 } ]
```

```
no vrrp-group group-ID [ version { 2 | 3 } ]
```

### Command Default

VRRP version 2 is the default.

### Parameters

*group-ID*

A value from 1 through 255 that you assign to the virtual router group.

**version**

Specifies in which version of VRRP the IPv4 VRRP group is to be configured.

2 | 3

Version 2 or version 3 of VRRP.

### Modes

Interface subtype configuration mode

### Usage Guidelines

Enter **no vrrp-group** *group-ID* to remove a specific VRRP group. If you remove a group, you cannot retrieve it. You would have to redo the configuration procedure.

You can specify in which version of VRRP the VRRP group is configured using the **version** keyword and either 2 or 3 as the version number. VRRPv3 supports both IPv4 and IPv6 addresses.

### Examples

The following example shows how to assign an Ethernet interface to the virtual router group with the ID of 1. (First you must enable VRRP on the switch.)

```
device(config)# protocol vrrp
device(config)# interface ethernet 1/6
device(config-if-eth-1/6)# vrrp-group 1
```



The following example shows how to assign an Ethernet interface to the virtual router group with the ID of 1 for VRRPv3. (First you must enable VRRP on the switch.)

```
device(config)# protocol vrrp
device(config)# interface ethernet 1/6
device(conf-if-eth-1/6)# vrrp-group 1 version 3
```

## History

Release version	Command history
16r.1.00	This command was introduced.

# vtep-discovery

Enables automatic VXLAN tunnel endpoint (VTEP) discovery by BGP.

## Syntax

**vtep-discovery**

**no vtep-discovery**

## Command Default

Enabled.

## Modes

BGP address-family L2VPN EVPN configuration mode

## Usage Guidelines

The **no** form of this command disables automatic VTEP discovery and creation of VXLAN tunnels.

## Examples

The following example disables automatic VTEP discovery by BGP.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family l2vpn evpn
device(config-bgp-evpn)# no vtep-discovery
```

The following example re-enables automatic VTEP discovery and creation of VXLAN tunnels by BGP.

```
device# configure terminal
device(config)# router bgp
device(config-bgp-router)# address-family l2vpn evpn
device(config-bgp-evpn)# vtep-discovery
```

## History

Release version	Command history
17r.1.01	This command was introduced.

# write erase

Returns the switch to factory default state.

## Syntax

**write erase**

## Modes

Privileged EXEC mode

## Usage Guidelines

This command can be used for device recovery or device configuration reset to the factory default state. Due to its disruptive nature, this command prompts the user about the consequence of losing all current user configuration and resetting the switch to the factory default state. It waits for the user's confirmation before proceeding.

## Examples

The following command shows executing the **write erase** command.

```
device# write erase
This command will erase all the configuration on the Compact Flash.
The specified VCS parameters will be set appropriately while
preserving the licenses and management ip-address.

System will go through disruptive reboots during the process.
Please upload all configurations if they need to be saved before
continuing with this command.

Do you want to continue? [y/n]:
```

## History

Release version	Command history
17r.1.00	This command was introduced.

# y1731

Enters the Y.1731 configuration mode.

## Syntax

y1731

no y1731

## Command Default

This feature is disabled.

## Modes

Protocol CFM configuration mode

## Usage Guidelines

Use the **no** form of the command to delete all test and action profiles configured under Y.1731 mode and the corresponding associations with source and target MEP pair.

## Examples

This example shows how to enter the Y1731 configuration mode.

```
device# configure terminal
device(config)# protocol cfm
device(protocol-cfm)# y1731
```

## History

Release version	Command history
17r.1.01	This command was introduced.