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# Extreme SLX-OS Scale and Standards Matrix for SLX 9030 and SLX 9030T

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## Contents

Document history .....	4
Preface .....	5
Contacting Extreme Technical Support.....	5
Extreme resources .....	5
Document feedback.....	6
RFC Compliance .....	7
General Protocols.....	7
MIBs .....	9
Virtualization Support .....	9
Layer 2 Switching .....	9
Layer 3 Routing .....	10
Automation and Programmability .....	10
Quality of Service .....	11
Management and Monitoring.....	11
Security .....	12
SLX-OS IEEE standards compliance .....	13
Scalability Matrix for SLX 9030/9030T .....	14

# Document history

<b>Version</b>	<b>Summary of changes</b>	<b>Publication date</b>
1.0	Initial Release	November 19, 2018

# Preface

## 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. 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

## 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.

# RFC Compliance

The RFCs listed in this document were first introduced in Release 17s.1.00. Unless otherwise noted, the SLX-OS RFCs and IEEE standards are supported from Release 17s.1.00 forward.

## General Protocols

- RFC 768 User Datagram Protocol (UDP)
- RFC 783 TFTP Protocol (revision 2)
- RFC 791 Internet Protocol (IP)
- RFC 792 Internet Control Message Protocol (ICMP)
- RFC 793 Transmission Control Protocol (TCP)
- RFC 826 ARP
- RFC 854 Telnet Protocol Specification
- RFC 894 A Standard for the Transmission of IP Datagram over Ethernet Networks
- RFC 959 FTP
- RFC 1027 Using ARP to Implement Transparent Subnet Gateways (Proxy ARP)
- RFC 1112 IGMP v1
- RFC 1157 Simple Network Management Protocol (SNMP) SNMP v1 and v2c
- RFC 1305 Network Time Protocol (NTP) Version 3
- RFC 1492 TACACS+
- RFC 1519 Classless Inter-Domain Routing (CIDR)
- RFC 1584 Multicast Extensions to OSPF
- RFC 1765 OSPF Database Overflow
- RFC 1812 Requirements for IP Version 4 Routers
- RFC 1997 BGP Communities Attribute
- RFC 2068 HTTP Server
- RFC 2131 Dynamic Host Configuration Protocol (DHCP)
- RFC 2154 OSPF with Digital Signatures (Password, MD-5)
- RFC 2236 IGMP v2
- RFC 2267 Network Ingress Filtering Option—Partial Support
- RFC 2328 OSPF v2
- RFC 2370 OSPF Opaque Link-State Advertisement (LSA)
- RFC 2375 IPv6 Multicast Address Assignments
- RFC 2439 BGP Route Flap Damping
- RFC 2460 Internet Protocol, Version 6 (v6) Specification (on management interface)
- RFC 2462 IPv6 Stateless Address Auto-Configuration
- RFC 2464 Transmission of IPv6 Packets over Ethernet Networks (on management interface)
- RFC 2474 Definition of the Differentiated Services Field in the IPv4 and IPv6 Headers
- RFC 2571 An Architecture for Describing SNMP Management Frameworks
- RFC 2710 Multicast Listener Discovery (MLD) for IPv6
- RFC 2711 IPv6 Router Alert Option
- RFC 2740 OSPFv3 for IPv6

- RFC 2865 Remote Authentication Dial-In User Service (RADIUS)
- RFC 2918 Route Refresh Capability
- RFC 3101 The OSPF Not-So-Stubby Area (NSSA) Option
- RFC 3137 OSPF Stub Router Advertisement
- RFC 3176 sFlow
- RFC 3392 Capabilities Advertisement with BGPv4
- RFC 3411 An Architecture for Describing SNMP Frameworks
- RFC 3412 Message Processing and Dispatching for the SNMP
- RFC 3413 Simple Network Management Protocol (SNMP) Applications
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- RFC 3587 IPv6 Global Unicast Address Format RFC 4291 IPv6 Addressing Architecture
- RFC 3682 Generalized TTL Security Mechanism for eBGP Session Protection
- RFC 3768 VRRP
- RFC 3826 The Advanced Encryption Standard (AES) Cipher Algorithm in the SNMP User-based Security Model
- RFC 4271 BGPv4
- RFC 4443 ICMPv6 (replaces 2463)
- RFC 4456 BGP Route Reflection
- RFC 4486 Sub Codes for BGP Cease Notification Message
- RFC 4510 Lightweight Directory Access Protocol (LDAP): Technical Specification Road Map
- RFC 4724 Graceful Restart Mechanism for BGP
- RFC 4750 OSPFv2 MIB
- RFC 4861 IPv6 Neighbor Discovery
- RFC 4893 BGP Support for Four-Octet AS Number Space
- RFC 5065 BGP4 Confederations
- RFC 5082 Generalized TTL Security Mechanism (GTSM)
- RFC 5291 Outbound Route Filtering Capability for BGP-4
- RFC 5396 Textual Representation of Autonomous System (AS) Numbers
- RFC 5668 4-Octet AS specific BGP Extended Community
- RFC 5880 Bidirectional Forwarding Detection (BFD)
- RFC 5881 Bidirectional Forwarding Detection (BFD) for IPv4 and IPv6 (Single Hop)
- RFC 5882 Generic Application of Bidirectional Forwarding Detection (BFD) RFC 5883 Bidirectional Forwarding Detection (BFD) for Multihop Paths
- RFC 5942 IPv6 Neighbor Discovery
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- RFC 7348 Virtual eXtensible Local Area Network (VxLAN)
- RFC 7432 BGP-EVPN—Network Virtualization Using VXLAN Data Plane
- RFC 8326 Graceful BGP Session Shutdown
- DRAFT : BGP EVPN with VxLAN Encapsulation : IETF Draft describing usage of BGP EVPN with VxLAN Data Plane
- DRAFT : BGP EVPN Inter Subnet Forwarding : IETF Draft describing inter-subnet forwarding support using BGP EVPN Control Plane



- DRAFT : BGP EVPN Prefix Advertisement : IETF Draft describing advertisement of IP Prefix routes using BGP EVPN Control Plane

## MIBs

- RFC 2863 The Interfaces Group MIB
- RFC 3176 SFLOW-MIB ver 1.3 (draft 5)
- RFC 3826 SNMP-USM-AES-MIB
- RFC 4022 TCP MIB
- RFC 4113 UDP MIB
- RFC 4133 Entity MIB (Version 3)
- RFC 4188 BRIDGE-MIB
- RFC 2674 P-BRIDGE-MIB
- RFC 4363 Q-BRIDGE-MIB
- RFC 4318 RSTP-MIB
- IEEE LAG-MIB
- IEEE LLDP-MIB
- IEEE LLDP-EXT-DOT1-MIB
- IEEE LLDP-EXT-DOT3-MIB
- RFC 4273 BGP-4 MIB
- RFC 4292 IP Forwarding MIB
- RFC 4293 IP MIB
- RFC 4750 OSPFv2 MIB
- RFC 7331 BFD MIB

## Virtualization Support

- VXLAN Routing
- VXLAN Bridging
- VXLAN Tunnel End Point
- VXLAN Multi-VN

## Layer 2 Switching

- Layer 2 Access Control Lists (ACLs)
- Address Resolution Protocol (ARP) RFC 826
- Layer 2 Loop prevention in an overlay environment
- IGMP v1/v2 Snooping
- MAC Learning and Aging
- Link Aggregation Control Protocol (LACP) IEEE 802.3ad/802.1AX
- Virtual Local Area Networks (VLANs)
- VLAN Encapsulation 802.1Q
- Per-VLAN Spanning Tree (PVST+/PVRST+)
- Rapid Spanning Tree Protocol (RSTP) 802.1w
- Multiple Spanning Tree Protocol (MSTP) 802.1s

- STP PortFast, BPDU Guard, BPDU Filter
- STP Root Guard
- Pause Frames 802.3x
- Static MAC Configuration
- Multi-Chassis Trunking (MCT)
- BD support
- VXLAN extension tunnels
- IP-based management cluster

## Layer 3 Routing

- Border Gateway Protocol (BGP4+)
  - DHCP Helper
  - Layer 3 ACLs
  - OSPF v2/v3
  - Static routes
  - IPv4/v6 ACL
  - 64-Way ECMP
  - VRF Lite
  - VRF-aware OSPF, BGP, VRRP, static routes
  - VRRP v2 and v3
  - IPv4/IPv6 dual stack
  - ICMPv6 Route-Advertisement Guard
  - Route Policies
  - IPv6 ACL packet filtering
  - BGP-Allow AS
  - IPv6 routing
  - OSPF Type-3 LSA Filter
  - Wire-speed routing for IPv4 and IPv6 using any routing protocol
  - BGP-EVPN Control Plane Signaling RFC 7432
  - BGP-EVPN VXLAN Standard-based Overlay
  - Multi-VRF
  - IP Unnumbered Interface
- Anycast Gateway over VXLAN
- L3 over Bridge Domain

## Automation and Programmability

- gRPC Streaming protocol and API
- REST API with YANG data model
- Python
- PyNOS libraries
- DHCP automatic provisioning
- NETCONF API

## Quality of Service

- ACL-based QoS
- Two Lossless priority levels for QoS
- Class of Service (CoS) IEEE 802.1p
- DSCP Trust
- COS Trust
- DSCP to Traffic Class Mutation
- DSCP to CoS Mutation
- COS to COS Mutation
- DSCP to DSCP Mutation
- COS to Traffic class mutation
- COS to DSCP Mutation
- Random Early Discard
- Per-port QoS configuration
- Dual-rate, three-color token bucket
- Storm-Control
- Scheduling: Strict Priority (SP), Deficit Weighted Round-Robin (DWRR)

## Management and Monitoring

- Zero-Touch Provisioning (ZTP)
- IPv4/IPv6 management
- Industry-standard Command Line Interface (CLI)
- NETCONF API
- REST API with YANG data model
- SSH/SSHv2
- Link Layer Discovery Protocol (LLDP) IEEE 802.1AB
- MIB II RFC 1213 MIB
- Syslog (RASlog, AuditLog)
- Multi-VRF
- Switched Port Analyzer (SPAN)
- Telnet
- SNMP v1, v2C, v3
- sFlow version 5
- Out-of-band management
- RMON-1, RMON-2
- NTP
- Management Access Control Lists (ACLs)
- Role-Based Access Control (RBAC)
- Range CLI support
- Python
- DHCP Relay
- SLX-OS and Linux Shell Interoperability

## Security

- AAA
- Port-based Network Access Control 802.1X
- RADIUS
- TACACS+
- Secure Shell (SSHv2)
- TLS 1.1, 1.2
- HTTP/HTTPS
- BPDU Drop
- Secure Copy Protocol
- Control Plane Policing (CPP)
- SFTP
- Port Security

# SLX-OS IEEE standards compliance

- IEEE 802.1D Spanning Tree Protocol
- IEEE 802.1s Multiple Spanning Tree
- IEEE 802.1w Rapid Reconfiguration of Spanning Tree Protocol
- IEEE 802.3 Ethernet
- IEEE 802.3ad Link Aggregation with LACP
- IEEE 802.3ab 1000BASE-T
- IEEE 802.3z 1000BASE-X
- IEEE 802.3ba / 80 2.3bm 40 GBASE-X and 100 GBASE-X
- IEEE 802.1Q VLAN Tagging
- IEEE 802.1p Class of Service Prioritization and Tagging
- IEEE 802.1v VLAN Classification by Protocol and Port
- IEEE 802.1AB Link Layer Discovery Protocol (LLDP)
- IEEE 802.3x Flow Control (Pause Frames)
- IEEE 802.3ae 10 GBASE-X
- IEEE 802.3 10 GBASE-T (up to 100 m using Cat6a cabling or better)

# Scalability Matrix for SLX 9030/9030T

		Extreme Switching SLX-9030
<b>LAYER 2 SWITCHING</b>		
MAC	Maximum Number of MACs per port (physical/LAG/MLAG)	48k
	Maximum Number of MACs per System	48K
VLANs	Maximum Number of VLANs per interface	4k
	Maximum number of VLANs per trunk port	4k
	Maximum Number of port-vlan associations	15743
	Maximum Number of VLANs per switch	4k
	Maximum Number of 802.1Q vlans w/o TLS	4k
Bridge Domain(BD)	Maximum Number of BDs per box	1k
LACP	Maximum Number of ports per port-channel per switch	32
	Maximum Number of port-channels per switch	64
STP/RSTP	Maximum Number of physical ports supported with STP	64
	Maximum Number of 8-port LAG interface supported with STP	8
MSTP	Maximum Number of instances	32
	Maximum Number of Vlans per instance	50
	Maximum Number of physical interfaces participating per instance	64

	Maximum Number of LAG interfaces participating per instance	64
PVST	Maximum number of VLANS	128
	Maximum number of interfaces	72
	Maximum number of instance	128
MCT	MCT Member Vlan's	4k
	MCT MAC Scale	48k
	MCT Switch Clients	30
LLDP	Maximum Number of neighbors per switch	64
	Number of neighbors per interface	1
	Number of active profiles (one per interface)	64
VXLAN	VXLAN L2 Gateway (Tunnels)	256
	Number of VLAN and BD extended over VXLAN	5k (4k Vlan + 1k BD)
<b>Multicast</b>		
IGMP	IGMPv2 snooping VLAN interfaces supported	512
	IGMPv2 snooping VLAN interfaces supported (MCT)	IGMP Snooping over MCT not supported
	Learning rate for IGMPv2 snooping	512 groups per second
	Maximum number of IGMP groups per system	1024
<b>IPv4 and IPv6</b>		
IPV4 Features	Maximum VEs per system	2k
	Number of VEs VRF	2k
	# of ARP entries	25k
	# of unique next hop routers	16k

	# static route	24k
	# of routes in HW	128k
	ECMPs for Static route	64
	#VRFs with Static Routing	128
	# of routes in SW	128k
	# of VRF	128
	# of ECMP	64
VRRP	# of VRRP instances per system (MCT mode)	127(ipv4+ipv6)
	# of VRRP instances per interface (MCT mode)	16
	# of VRRP routers (MCT mode)	2
	# of VRRPv3 instance	127
IPv6 Features	Number of VEs	2k
	Number of VEs VRF	1k
	Number of ND Entries	5k
	IPv6 Routes	10k
	FIB, H/W Routes	10k
	Static Routes with ecmp	64
	# of ip interfaces (Routed ports) per system	2k
	# of secondary ip address	255
	Max # IP address in HW	10k
	Number of maximum unique nexthops	512
	Static Routes	10k
	# of VRF with Static Routing	128
	# of VRF	128
	# of ECMP	64



<b>Routing Protocols</b>		
BGP IPv4	# of IBGP Peers (No. of BGP sessions)	512
	# of EBGP Peers (No. of BGP sessions)	512
	# of RIB in + out routes	3.25M
	BGP v4 Routes	64k
	# of Max BGP Peer Group	250
	Maximum paths(ECMP) with BGP	64
BGP IPv6	# of IBGP Peers (No. of BGP sessions)	512
	# of EBGP Peers (No. of BGP sessions)	512
	# of RIB in + out routes	1M
	BGP v6 Routes	15k
OSPF	# of OSPF areas	200
	# of OSPF routers in a single area	200
	# of OSPF adjacencies	200
	# of OSPF neighbors	200
	# of OSPF routes	64k
	# of OSPF interfaces	200
	# of OSPF enabled subnets	200
	# of local subnets in a single area	200
	intra area routes with min neighbors	64k
	inter area routes with min neighbors	64k
	external routes with min neighbors	64k
	# of VRFs supported by OSPF	128
	OSPFv2 with ECMP	64
OSPFv3	OSPFv3 Interfaces	200
	OSPFv3 Routes	15k
	OSPF Neighbors	200

	intra area routes with min neighbors	15k
	inter area routes with min neighbors	15k
	external routes with min neighbors	15k
	Ospf v3 with ecmp	64
	OSPFV3 VRF	128
ACLs	Maximum ACLs	2k
	Maximum rules per ACL	1k
	Maximum rules per Ingress ACL	1k
	max rules per egress ACL	246
	max rules per system(software)	100k
Layer 2 ACL	MAX ACL Rules (across all ACL types)	502-Ingress, 246- Egress
	MAX ACL Config (per type)	502-Ingress, 246- Egress
	# of Rules per ACL	502-Ingress, 246- Egress
QOS	Maximum Number of Traffic Classes	8
	On chip buffers per ASIC (shared between ingress and egress)	12 MB
	Max schedulers on SYSTEM	72
	Max shaper per system	72
	POLICY-MAP MAX config on SYSTEM (Created in SW globally)	1k
	CLASS-MAP MAX config per policy	4k
	POLICY-MAP MAX config per interface	1
	SERVICE-POLICY - per interface	1 per direction
	CLASS-MAP MAX config on SYSTEM (Created in SW globally)	32k
	DEFAULT CLASS-MAP per POLICY	1

	MATCH ACL CLASS-MAP per POLICY	4k non default class map per policy-map
	PORT-BASED IN service-policy on SYSTEM	Equal to # of ports
	MATCH ACL CLASS IN service-policy on SYSTEM	4K non default-class map per policy-map
	PORT-BASED IN service-policy on SYSTEM	Equal to # of ports
	STORM-CONTROL (BUM traffic policy)	3
	Maximum number of ACL table per CLASS	1
	Number of Policers	8k
	Maximum RED profiles configured (SW)	32
	Maximum RED profiles configured (HW)	32
	PCP->TC	64
	DSCP->TC	64
<b>Monitoring</b>		
<b>Mirroring</b>	Mirror Port and Monitor Ports	51 Monitor Ports
	ACL-based Inbound Mirroring	4
<b>IP Fabric</b>		
	VXLAN Tunnels	256
	MAC entries (SW)	47k
	ARP entries (SW)	37k
	ND entries (SW)	5k
	MAC entries (HW)	47k
	ARP entries (HW)	12k with L3VNI. 12k with L2VNI
	ND entries (HW)	5k
<b>BGP eVPN</b>	BGP EVPN sessions	64

	BGP eVPN v4 route (SW)	128k
	BGP eVPN v6 route (SW)	64k
	BGP eVPN v4 route (HW)	123k
	BGP evpn v6 route (HW)	15k
	BGP evpn macIP routes (SW)	54k
	BGP evpn Mac routes (SW)	47k
	IP Unnumbered interface	64
	ECMP	64
	No. of SAG per system	256
	No. of SAG address per interface	32
	No VRFs in BGP eVPN	128
	No of vlans/BD extended	2k