



ExtremeXOS Release Notes

Software Version ExtremeXOS 16.2.4-Patch1-3



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Preface

Conventions

This section discusses the conventions used in this guide.

Text Conventions

The following tables list text conventions that are used throughout this guide.

Table 1: Notice Icons






| Icon | Notice Type | Alerts you to... |
|---|----------------|--|
|  | General Notice | Helpful tips and notices for using the product. |
|  | Note | Important features or instructions. |
|  | Caution | Risk of personal injury, system damage, or loss of data. |
|  | Warning | Risk of severe personal injury. |
|  | New | This command or section is new for this release. |

Table 2: Text Conventions

| Convention | Description |
|--|---|
| Screen displays | This typeface indicates command syntax, or represents information as it appears on the screen. |
| The words enter and type | When you see the word “enter” in this guide, you must type something, and then press the Return or Enter key. Do not press the Return or Enter key when an instruction simply says “type.” |
| [Key] names | Key names are written with brackets, such as [Return] or [Esc] . If you must press two or more keys simultaneously, the key names are linked with a plus sign (+). Example: Press [Ctrl]+[Alt]+[Del] |
| <i>Words in italicized type</i> | Italics emphasize a point or denote new terms at the place where they are defined in the text. Italics are also used when referring to publication titles. |

Platform-Dependent Conventions

Unless otherwise noted, all information applies to all platforms supported by ExtremeXOS® software, which are the following:

- ExtremeSwitching® switches
- Summit® switches
- SummitStack™

When a feature or feature implementation applies to specific platforms, the specific platform is noted in the heading for the section describing that implementation in the ExtremeXOS command documentation (see the Extreme Documentation page at <http://documentation.extremenetworks.com>). In many cases, although the command is available on all platforms, each platform uses specific keywords. These keywords specific to each platform are shown in the Syntax Description and discussed in the Usage Guidelines sections.

Terminology

When features, functionality, or operation is specific to a switch family, such as ExtremeSwitching™ or Summit®, the family name is used. Explanations about features and operations that are the same across all product families simply refer to the product as the switch.

Providing Feedback to Us

We are always striving to improve our documentation and help you work better, so we want to hear from you! We welcome all feedback but especially want to know about:

- Content errors or confusing or conflicting information.
- Ideas for improvements to our documentation so you can find the information you need faster.
- Broken links or usability issues.

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 - **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.
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- **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

Related Publications

ExtremeXOS Publications

- *ACL Solutions Guide*
- *ExtremeXOS 16.2 Command Reference Guide*
- *ExtremeXOS 16.2 EMS Messages Catalog*
- *ExtremeXOS 16.2 Feature License Requirements*
- *ExtremeXOS 16.2 User Guide*
- *ExtremeXOS OpenFlow User Guide*
- *ExtremeXOS Quick Guide*
- *ExtremeXOS Legacy CLI Quick Reference Guide*
- *ExtremeXOS Release Notes*
- *Extreme Hardware/Software Compatibility and Recommendation Matrices*
- *Switch Configuration with Chalet for ExtremeXOS 16.2 and Earlier*
- *Using AVB with Extreme Switches*

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1 Overview

New and Corrected Features in ExtremeXOS 16.2
ExtremeXOS 16.2 Software Image Changes
New Hardware Supported in ExtremeXOS 16.2
Vulnerability Notice
ExtremeXOS CLI Command Output Format Changes
Circuit Emulation Service (CES) No Longer Supported
ExtremeXOS SSH Server Upgraded with OpenSSH v6.5
OpenFlow No Longer Supported on SummitStack
Extreme Hardware/Software Compatibility and Recommendation Matrices
Compatibility with Extreme Management Center (Formerly NetSight)
Upgrading ExtremeXOS
Supported MIBs
Tested Third-Party Products
Extreme Switch Security Assessment
Service Notifications

These release notes document ExtremeXOS 16.2.4-Patch1-3 which resolves software deficiencies.

New and Corrected Features in ExtremeXOS 16.2

This section lists the new and corrected features supported in the 16.2 software:

Cisco Discovery Protocol (CDPv2)

Support for Cisco Discovery Protocol (CDPv1) was added in ExtremeXOS 15.4. This update to the feature adds support for Cisco Discovery Protocol (CDPv2). CDPv2 is a proprietary protocol designed by Cisco to help administrators collect information about nearby, and directly connected, devices. Support for listening, lifting, processing, and periodic transmitting of the CDPv1/v2 control packets on a per-port basis is implemented in this current release.

Supported Platforms

- Summit X430, X440, X450-G2, X460, X460-G2, X480, X670, X670-G2, X770 series switches
- BlackDiamond X8 and 8000 series switches
- E4G-200 and E4G-400 cell site routers

Limitations

- SNMP is not supported.

Changed CLI Commands

Changes are underlined.

```
configure cdp voip-vlan [vlan_name | vlan_id | dot1p | untagged | none]
ports [port_list | all]
```

```
configure cdp trust-extend [untrusted | trusted] ports [port_list | all]
```

```
configure cdp cos-extend cos_value ports [port_list | all]
```

```
show cdp ports {port_list} {configuration}
```

```
configure cdp power-available [advertise | no-advertise] ports [port_list | all]
```

The output of the following show commands is changed (shown in bold):

```
X460-48t.1 # show cdp
CDP Transmit time           : 60 seconds
CDP Hold time               : 180 seconds
CDP Device ID               : 00:04:96:8B:C2:CA
CDP Enabled ports          : 1-2, 7
Power Available TLV Enabled ports: 1-2,23
```

```
X460-48t.23 # show cdp ports
Neighbor Information
-----
Port  Device-Id                Hold time  Remote CDP  Port ID
-----
1     Eni-Extreme-x440-sw> 149        Version-1   Slot: 1, Port: 1
2     00:04:96:8B:9D:B0      160        Version-2   Slot: 1, Port: 2
7     00:04:96:8B:C1:ED      138        Version-2   Slot: 1, Port: 7
> indicates that the value was truncated to the column size in the output.
Use the "show cdp neighbor detail" command to see the complete value.
```

```
X460-48t.3 # show cdp neighbor
Device Id          Local      Hold      Capability  Platform      Port Id
-----
Eni-Extreme-x440-sw> 1          150       T          X440-24t-10G  Slot: 1, P>
00:04:96:8B:9D:B0  2          171       T          X440-48t      Slot: 1, P>
00:04:96:8B:C1:ED  7          134       T          X460-48t      Slot: 1, P>
```

```
Capability Codes: R - Router, T - Trans Bridge, B - Source Route Bridge,
                  S - Switch, H - Host, I - IGMP, r - Repeater
> indicates that the value was truncated to the column size in the output.
Use the "detail" option to see the complete value.
```

```
X460-48t.7 # show cdp neighbor detail
-----
Device ID           : Eni-Extreme-x440-switch-1
Port ID (outgoing port) : Slot: 1, Port: 1
Advertisement Version : 2
IP Addresses        : 10.10.10.2
Platform            : X440-24t-10G
Interface           : 1
Holdtime            : 173

Version             :
ExtremeXOS version 15.7.0.22 fixes_v1570b9 by kosharma
```



```

on Tue Feb 24 11:53:33 IST 2015

Native VLAN      : 1
Duplex           : Full
SysName         : X440-24t-10G
Location        : Chennai
Power Request Id : 24333
Power Management Id : 2
Power Drawn     : 1500 mW
Power Consumed  : 3454 mW

X460-48t.11 # show cdp ports configuration
Local Port Information
-----
Port      Trust      COS   Voice-VLAN
-----
1         Trusted    0     none
2         Untrusted  4     none
7         Untrusted  0     Default

```

Virtual Router Redundancy Protocol (VRRP) Fabric Routing

Virtual Router Redundancy Protocol (VRRP) has one master router that does L3 routing and one or more backup routers that perform L2 forwarding of packets toward the master router, as per VRRP RFC specification. With this method, L3 routing capability of backup routers goes unused. This also causes loss of bandwidth in the links that connect master and backup routers. This issue is present in any topology where host traffic is flowing using the backup routers. With multiple backup routers, traffic from hosts attached to some backup routers have to traverse multiple links to reach the master router. This causes loss of bandwidth in multiple links toward the master.

This feature allows backup routers to take part in L3 routing for the packets it receives with the destination address equal to VMAC. Backup routers enabled with this feature are called Fabric Routing Enabled Backup (FREB) routers. This feature allows:

- Load sharing of traffic between VRRP routers
- Bandwidth savings on the links connecting master and backup routers

This solution is applicable for all topologies, such as MLAG, EAPS, or STP.

Supported Platforms

- Summit X440, X450-G2, X460, X460-G2, X480, X670, X670-G2, X770 series switches
- BlackDiamond X8 and 8000 series switches
- E4G-200 and E4G-400 cell site routers

Limitations

- Fabric Routing feature is not supported for VRRP VR for which Virtual IP is same as interface IP (owned IP).
- Traffic sent from host destined for VIP is L3 forwarded by FREB router if FREB router sits in between, even though both are in same subnet. VIP cannot be used to run protocols between host and VRRP router, which expects TTL value to not be decremented, for example BFD.
- PVLAN configuration will not be supported in this release.
- VLAN Aggregation configuration will not be supported in this release.

New CLI Commands

```
configure vrrp {vlan vlan_name vr vr_id | all} fabric-route-mode [on | off]
```

Virtual Router Redundancy Protocol (VRRP) Host Mobility

The Virtual Router Redundancy Protocol (VRRP) Host mobility feature solves the Asymmetric routing problem associated with VRRP where the path to return to an end host may be different and longer than necessary. This feature uses host-routes to indicate where in the network an end host resides. Using other routing protocols such as OSPF, other routers then pick the shortest path back to the end host when multiple paths are available using Equal Cost Multi Path (ECMP) route entries.

Supported Platforms

- Summit X440, X450-G2, X460, X460-G2, X480, X670, X670-G2, X770 series switches
- BlackDiamond X8 and 8000 series switches
- E4G-200 and E4G-400 cell site routers

Limitations

- Bound to FDB's ARP limitations
- Bound to Route Manager's entry limitations

Changed CLI Commands

Changes are underlined.

```
configure vrrp {vlan} vlan_name vrid vridval host-mobility [{on | off}
{exclude-ports [add | delete] port_list}]
```

```
configure iproute {ipv4} priority [static | blackhole | rip | bootp | icmp
| ospf-intra | ospf-inter | ospf-as-external| ospf-extern1 | ospf-extern2 |
ebgp | ibgp | mpls | isis | isis-level-1 | isis-level-2 | isis-level-1-
external | isis-level-2-external | host-mobility] priority {vr vrname}
```

```
unconfigure iproute {ipv4} priority [static | blackhole | rip | bootp |
icmp | ospf-intra | ospf-inter | ospf-as-external | ospf-extern1 | ospf-
extern2 | ebgp | ibgp | mpls | isis | isis-level-1 | isis-level-2 | isis-
level-1-external | isis-level-2-external | host-mobility | all ] {vr
vrname}
```

```
configure iproute ipv6 priority [static | blackhole | ripng | icmp |
ospfv3-intra | ospfv3-inter | ospfv3-as-external| ospfv3-extern1 | ospfv3-
extern2 | isis | isis-level-1 | isis-level-2 | isis-level-1-external | isis-
level-2-external | host-mobility] priority {vr vrname}
```

```
unconfigure iproute ipv6 priority [static | blackhole | ripng | icmp |
ospfv3-intra | ospfv3-inter | ospfv3-as-external | ospfv3-extern1 | ospfv3-
extern2 | isis | isis-level-1 | isis-level-2 | isis-level-1-external| isis-
level-2-external | host-mobility | all ] {vr vrname}
```

The existing `enable ospf export`, `disable ospf export`, and `configure ospf export` commands are expanded to allow a new route type of "host-mobility." Configuring host-mobility to be exported causes OSPF to redistribute host-mobility routes.

The existing `enable ospfv3 export` and `disable ospfv3` commands are expanded to allow a new route type of "host-mobility." Configuring host-mobility to be exported causes OSPFv3 to redistribute host-mobility routes.

The output of the following show commands is changed (shown in bold):

```
# show vrrp detail
VLAN: vlan23   VRID: 1           VRRP: Disabled State: INIT
Virtual Router: VR-Default
Priority: 100(backup) Advertisement Interval: 1 sec
Version: v3-v2 Preempt: Yes Preempt Delay: 0 sec
Virtual IP Addresses:
Accept mode: Off
Host-Mobility: On
Host-Mobility Exclude-Ports: 1, 10
Checksum: Include pseudo-header
Tracking mode: ALL
Tracked Pings: -
Tracked IP Routes: -
Tracked VLANs: -
Fabric Routing: Off

# show ospf
OSPF : Disabled           MPLS LSP as Next-Hop: No
RouterId : 0.0.0.0       RouterId Selection : Automatic
ASBR : No                ABR : No
ExtLSA : 0              ExtLSAChecksum : 0x0
OriginateNewLSA : 0     ReceivedNewLSA : 0
SpfHoldTime : 3         Lsa Batch Interval : 30s
CapabilityOpaqueLSA : Enabled
10M Cost : 10           100M Cost : 5
1000M Cost (1G) : 4     10000M Cost (10G) : 2
40000M Cost (40G) : 2
100000M Cost (100G) : 1
Router Alert : Disabled   Import Policy File :
ASExternal LSALimit : Disabled Timeout (Count) : Disabled (0)
Originate Default : Disabled
SNMP Traps : Disabled
VXLAN Extensions : Disabled
Redistribute:
Protocol      Status  cost  Type  Tag      Policy
direct        Disabled 0     0     0        None
static        Disabled 0     0     0        None
rip           Disabled 0     0     0        None
e-bgp         Disabled 0     0     0        None
i-bgp         Disabled 0     0     0        None
isis-level-1  Disabled 0     0     0        None
isis-level-2  Disabled 0     0     0        None
isis-level-1-external Disabled 0     0     0        None
isis-level-2-external Disabled 0     0     0        None
host-mobility Enabled 0     2     0        None

# show ospfv3
OSPFv3 : Disabled           RouterId : 0.0.0.0
RouterId Selection : Automatic ASBR : No
ABR : No                ExtLSAs : 0
ExtLSAChecksum : 0x0     OriginateNewLSAs : 0
ReceivedNewLSAs : 0     SpfHoldTime : 3s
```

```

Num of Areas      : 1                LSA Batch Interval : 0s
10M Cost          : 100             100M Cost          : 50
1000M Cost (1G)  : 40             10000M Cost (10G) : 20
40000M Cost (40G): 20             100000M Cost (100G): 10
Graceful Restart  : None           Grace Period       : 120s
Import Policy File : none

```

Redistribute:

| Protocol | Status | Cost | Type | Tag | Policy |
|-----------------------|----------------|----------|----------|------------|-------------|
| direct | Disabled | 20 | 2 | --- | none |
| e-bgp | Disabled | 20 | 2 | --- | none |
| i-bgp | Disabled | 20 | 2 | --- | none |
| ripng | Disabled | 20 | 2 | --- | none |
| static | Disabled | 20 | 2 | --- | none |
| isis-level-1 | Disabled | 20 | 2 | --- | none |
| isis-level-2 | Disabled | 20 | 2 | --- | none |
| isis-level-1-external | Disabled | 20 | 2 | --- | none |
| isis-level-2-external | Disabled | 20 | 2 | --- | none |
| host-mobility | Enabled | 0 | 2 | --- | none |

show iproute

```

Ori Destination      Gateway          Mtr  Flags          VLAN          Duration
d 192.168.24.0/24    192.168.24.44   1    -----um---- vlan24         0d:4h:20m:48s
*hm 192.168.23.1/32  192.168.23.1    1    UGHD---u---f-  vlan23         0d:0h:16m:5s

(mo) MOSPF (o) OSPF, (o1) OSPFExt1, (o2) OSPFExt2,
(oa) OSPFIntra, (oe) OSPFAsExt, (or) OSPFInter, (pd) PIM-DM, (ps) PIM-SM,
(r) RIP, (ra) RtAdvrt, (s) Static, (sv) SLB_VIP, (hm) Host-mobility, (un) UnKnown,
(*) Preferred unicast route (@) Preferred multicast route,
(#) Preferred unicast and multicast route.

```

```

Flags: (b) BFD protection requested, (B) BlackHole, (c) Compressed, (D) Dynamic,
(f) Provided to FIB, (G) Gateway, (H) Host Route, (l) Calculated LDP LSP,
(L) Matching LDP LSP, (m) Multicast, (p) BFD protection active, (P) LPM-routing,
(R) Modified, (s) Static LSP, (S) Static, (t) Calculated RSVP-TE LSP,
(T) Matching RSVP-TE LSP, (u) Unicast, (U) Up, (3) L3VPN Route.

```

MPLS Label: (S) Bottom of Label Stack

Mask distribution:

1 routes at length 24

Route Origin distribution:

1 routes from Direct

Total number of routes = 1

Total number of compressed routes = 0

show iproute ipv6

```

Ori Destination      Gateway          Mtr  Flags          Duration
*hm 2000::/128         2000::2         1    UGHD---u---f-  0d:0h:0m:7s
#d 2000::/64         2000::1         1    U-----um--f-  0d:20h:19m:46s
#d fe80::%vlan23/64  fe80::204:96ff:fe51:f96d  1    U-----um--f-  0d:20h:19m:46s

```

```

Origin(Ori):(b) BlackHole, (be) EBGp, (bg) BGP, (bi) IBGP, (bo) BOOTP,
(ct) CBT, (d) Direct, (df) DownIF, (dv) DVMRP, (el) ISISL1Ext,
(e2) ISISL2Ext, (h) Hardcoded, (i) ICMP, (il) ISISL1 (i2) ISISL2,
(is) ISIS, (mb) MBGP, (mbe) MBGPEExt, (mbi) MBGPInter, (ma) MPLSIntra,
(mr) MPLSInter, (mo) MOSPF (o) OSPFv3, (o1) OSPFv3Ext1, (o2) OSPFv3Ext2,
(oa) OSPFv3Intra, (oe) OSPFv3AsExt, (or) OSPFv3Inter, (pd) PIM-DM, (ps) PIM-
SM,
(r) RIPng, (ra) RtAdvrt, (s) Static, (sv) SLB_VIP, (hm) Host-mobility, (un)

```

```

UnKnown,
    (*) Preferred unicast route (@) Preferred multicast route,
    (#) Preferred unicast and multicast route.

Flags: (b) BFD protection requested, (B) BlackHole, (c) Compressed Route,
        (D) Dynamic, (f) Provided to FIB, (G) Gateway, (H) Host Route,
        (l) Calculated LDP LSP, (L) Matching LDP LSP, (m) Multicast,
        (p) BFD protection active, (P) LPM-routing, (R) Modified, (s) Static LSP,
        (S) Static, (t) Calculated RSVP-TE LSP, (T) Matching RSVP-TE LSP,
        (u) Unicast, (U) Up, (3) L3VPN Route.

Mask distribution:
    2 routes at length 64

Route Origin distribution:
    2 routes from Direct

Total number of routes = 3
Total number of compressed routes = 0

```

```

# show iproute priority
Direct          10
MPLS            20
Blackhole       50

Static          1100
HostMobility   1150
ICMP            1200
EBGP            1700
IBGP            1900
OSPFIntra      2200
OSPFInter      2300
Isis            2350
IsisL1         2360
IsisL2         2370
RIP             2400
OSPFAsExt      3100
OSPFExt1       3200
OSPFExt2       3300
IsisL1Ext      3400
IsisL2Ext      3500
Bootp          5000

```

```

# show iproute ipv6 priority
Direct          10
Blackhole       50

Static          1100
HostMobility   1150
ICMP            1200
EBGP            1700
IBGP            1900
OSPFv3Intra    2200
OSPFv3Inter    2300
Isis            2350
IsisL1         2360
IsisL2         2370
RIPng          2400
OSPFv3AsExt    3100
OSPFv3Ext1     3200
OSPFv3Ext2     3300
IsisL1Ext      3400

```

Internet Protocol Flow Information Export (IPFIX) Mirroring Enhancement

This feature enhances the mirroring capabilities in ExtremeXOS by adding IPFIX flow traffic support, in addition to the previously supported port and VLAN traffic. With the ability to mirror IPFIX flow traffic, you can leverage the combined capabilities of Internet Protocol Flow Information Export (IPFIX) and ExtremeAnalytics to provide additional information about flows. IPFIX can detect flows and collect flow statistics, but it cannot do deep packet payload inspections. ExtremeAnalytics, however, can do deep packet inspection beyond Layer 4, if it is provided with a copy of the packet payload. This feature mirrors the first 15 packets of any IPFIX flow to a port where ExtremeAnalytics is able to receive the packets for deep packet inspection.

Supported Platforms

- Summit X460, X460-G2 series switches
- BlackDiamond X8 series switches (40G12X-XL, 100G4X-XL, and 100G4X)

Changed CLI Commands

Changes are underlined>.

```
configure mirror {mirror_name | mirror_name_li} add | delete [vlan name
{ingress | port port {ingress}} | ip-fix | port port {vlan name {ingress}
| ingress | egress | ingress-and-egress | anomaly}]
```

The output of the following show command is changed (shown in bold):

```
# show mirror

DefaultMirror (Disabled)
  Description:   Default Mirror Instance, created automatically
  Mirror to port: -

MyMirror (Disabled)
  Description:
  Mirror to port: 2:1
  Source filters configured :
    Ports 2:2-3, all vlans, ingress and egress
    Port 2:5, ip-fix
```

Ethernet Ring Protection Switching (ERPS) Management Information Base (MIB) Support

Managed objects for Ethernet Ring Protection Switching (ERPS) Management Information Base (MIB) are defined in ExtremeXOS 16.2. ExtremeXOS 16.2 implements:

- extremeErpsProtectedVlanTable—contains the grouping of set of protected VLANs
- extremeErpsRingTable—each entry in extremeErpsRingTable has information about one ring in the switch
- extremeErpsStatsTable—contains statistics information for each of the rings present in the switch
- extremeErpsGlobalInfo—contains the information of ERPS configured globally in the switch
- extremeErpsNotification—contains two types of traps, extremeErpsStateChangeTrap and extremeErpsFailureTrap

Supported Platforms

- Summit X430, X440, X450-G2, X460, X460-G2, X480, X670, X670-G2, X770 series switches
- BlackDiamond X8 and 8000 series switches
- E4G-200 and E4G-400 cell site routers

Limitations

Groups and tables are implemented as read-only.

ExtremeCFM Management Information Base (MIB)

This feature introduces the proprietary ExtremeCFM Management Information Base (MIB) that provides information about the Connectivity Fault Management (CFM) Group. This is an extension to IEEE8021-CFM-MIB.

The following objects are defined in the CFM Group MIB module:

- extremeCfmNotifications
- extremeCfmMibObjects
- extremeCfmMibConformance

Supported Platforms

- Summit X430, X440, X450-G2, X460, X460-G2, X480, X670, X670-G2, X770 series switches
- BlackDiamond X8 and 8000 series switches
- E4G-200 and E4G-400 cell site routers

Link Aggregation Control Protocol (LACP) Fallback Option Feature

Preboot Execution Environment (PXE) is an industry standard client/server environment that allows workstations to boot from the server before their full operating system is up and running. PXE images are too small to take advantage of Link Aggregation Control Protocol (LACP) functionality, and therefore it is up to the administrator to statically configure the switch for correct connectivity. This also means that after the full operating system is up and running, the switch needs to be reconfigured for LACP. The LACP Fallback option automates this process.

The LACP Fallback option lets you select a single port that is automatically added to the aggregator if LACP data units (LACPDUs) do not appear on any of the member ports within the specified period of time. If LACPDUs are exchanged before this timeout expires, an aggregator is formed using traditional means. If LACPDUs are not received, an active port with the lowest priority value is automatically added to the aggregator (enters fallback state). If ports have the same priority value, the lowest port number on the lowest slot number is chosen.

The selected port stays in the fallback state until fallback is disabled or until LACPDUs are received on any of the member ports, at which point the old aggregator is removed and a new one is selected based on information propagated in the LACPDUs. The new fallback port may also be re-elected if the existing fallback port changes its state (for example, port priority change, link bounce, port disable/enable, etc.).

The LACP fallback option configuration consists of:

- Selecting a fallback port by setting its LACP port priority (optional)
- Configuring the fallback timeout (optional)
- Enabling fallback (mandatory)

Supported Platforms

- Summit X430, X440, X450-G2, X460, X460-G2, X480, X670, X670-G2, X770 series switches
- BlackDiamond X8 and 8000 series switches
- E4G-200 and E4G-400 cell site routers

Limitations

When using LACP fallback with MLAG, fallback port is selected only on the LACP master.

New CLI Commands

configure **sharing port lacp fallback [enable | disable]**

Changed CLI Commands

The **show lacp lag group-id detail** command now shows fallback information (shown in bold):

```
# show lacp lag 17 detail
```

| Lag | Actor Sys-Pri | Actor Key | Partner MAC | Partner Sys-Pri | Partner Key | Agg Count | Actor MAC |
|-----|------------------|--------------|-------------------|--------------------|----------------|--------------|-------------------|
| 17 | 0 | 0x03f9 | 00:00:00:00:00:00 | 0 | 0x0000 | 1 | 00:04:96:6d:55:13 |

```

Enabled           : Yes
LAG State         : Up
Unack count       : 0
Wait-for-count    : 0
Current timeout   : Long
Activity mode     : Active
Defaulted Action : Delete
Fallback         : Enabled
Fallback timeout : 40 seconds
Receive state     : Enabled
Transmit state    : Enabled
Minimum active    : 1
Selected count    : 1
Standby count     : 0
LAG Id flag       : Yes
  S.pri:0        , S.id:00:04:96:6d:55:13, K:0x03f9
  T.pri:0        , T.id:00:00:00:00:00:00, L:0x0000

Port list:

```

| Member Port | Port Priority | Rx State | Sel Logic | Mux State | Actor Flags | Partner Port |
|----------------|------------------|-------------|-----------------|--------------|----------------|-----------------|
| 17 | 10 | Initialize | Unselected | Detached | A-G----- | 0 |
| 18 | 5 | Initialize | Fallback | Collect-Dist | A-GSCD-- | 1018 |
| 19 | 5 | Idle | Unselected | Detached | ----- | 0 |

```

=====
Actor Flags: A-Activity, T-Timeout, G-Aggregation, S-Synchronization
              C-Collecting, D-Distributing, F-Defaulted, E-Expired

```


The `show lacp member-port port detail` command now shows fallback information (shown in bold):

```
# show lacp member-port 18 detail

Member      Port      Rx          Sel          Mux          Actor       Partner
Port        Priority  State       Logic         State        Flags       Port
-----
18           5         Initialize  Fallback    Collect-Dist A-GSCD--   1018
Up           : Yes
Enabled      : Yes
Link State   : Up
Actor Churn  : False
Partner Churn : True
Ready_N      : Yes
Wait pending : No
Ack pending  : No
LAG Id:
  S.pri:0    , S.id:00:04:96:6d:55:13, K:0x03f9, P.pri:65535, P.num:1018
  T.pri:0    , T.id:00:00:00:00:00:00, L:0x0000, Q.pri:65535, Q.num:1018
Stats:
Rx - Accepted                               : 0
Rx - Dropped due to error in verifying PDU   : 0
Rx - Dropped due to LACP not being up on this port : 0
Rx - Dropped due to matching own MAC        : 0

Tx - Sent successfully                       : 1162
Tx - Transmit error                          : 0
=====
Actor Flags: A-Activity, T-Timeout, G-Aggregation, S-Synchronization
              C-Collecting, D-Distributing, F-Defaulted, E-Expired
```

OpenSSL Federal Information Processing Standards (FIPS) Object Module v2.0

This feature adds Federal Information Processing Standards (FIPS) compliance Object Module v2.0 (an open source library named openssl-fips-ecp-2.0.9).

OpenSSL is a software library used in applications to secure communications against eavesdropping or to ascertain the identity of the party at the other end. This feature does not validate the OpenSSL module itself, but instead implements a new software component called the OpenSSL FIPS Object Module.

Supported Platforms

- Summit X430, X440, X450-G2, X460, X460-G2, X480, X670, X670-G2, X770 series switches
- BlackDiamond X8 and 8000 series switches
- E4G-200 and E4G-400 cell site routers

New CLI Commands

```
configure security fips-mode [on | off]
```

```
show security fips-mode
```

Link Aggregation Group (LAG) Support for Audio Video Bridging (AVB)

This feature completes the capability to use Link Aggregation Group (LAG) ports with Audio Video Bridging (AVB) by adding support for LAG ports with Multiple Stream Reservation Protocol (MSRP).

This feature adds two modes for how MSRP calculates the available bandwidth of a LAG for use in making stream reservations:

- Single-port mode simply provides link redundancy and the LAG effective bandwidth is the same as the bandwidth of a single member port.
- Cumulative mode allows bandwidth aggregation and the LAG effective bandwidth is set to a configurable percent of aggregate bandwidth of the member ports in the LAG. This feature also adds generalized Precision Time Protocol (gPTP) configuration support at the LAG level. Only the LAG master port needs to be specified when making gPTP configurations. However, the protocol is still running on each member port at the physical port level.

Supported Platforms

Summit X430, X440, X460, X460-G2, X670, X670-G2, and X770 series switches

Changed CLI Commands

```
show msrp ports {port_list} detail
```

For the preceding command, with LAG support, the port speed is replaced with “effective speed.”.For physical ports, the effective speed is equivalent to the port speed (shown in bold).

| Port | Enabled | Oper | Effectv Speed | Dplx | Jumbo | Jumbo | Cls Size | Bndry | State | Sr-Pvid App/Reg |
|------|---------|------|--------------------------|------|-------|-------|-------------|--------|----------------|--------------------|
| *2g | Y | Up | 150 M | Full | N | 9216 | A B | N N | QA/IN QA/IN | 2 2 |
| *48 | Y | Up | 1000 M | Full | N | 9216 | A B | N N | QA/IN QA/IN | 2 2 |

With the **detail** option, and if the port is a LAG, additional information appears:

```
Load sharing ports:
```

| Port | Port Speed | BW Mode | Percentage |
|------|---------------|------------|------------|
| *2g | 200 M | Cumulative | 40% |

Event Management System (EMS) IPv6 Syslog Server Support

This feature adds support for the Event Management System (EMS) to send log messages to Syslog servers having IPv6 addresses.

The Event Management System supports the logging of event occurrences to external Syslog server targets. Each Syslog server target is identified by its IP address, UDP port, VRID, and local use facility (for example: “local0” through “local7”). Previously, the IP address of a Syslog server target was limited to the IPv4 address family, but with this feature it can be of the IPv6 address family.

Supported Platforms

- Summit X430, X440, X450-G2, X460, X460-G2, X480, X670, X670-G2, X770 series switches

- BlackDiamond X8 and 8000 series switches
- E4G-200 and E4G-400 cell site routers

Changed CLI Commands

The existing EMS (“log”) commands relevant to Syslog server targets now support IPv6 server (and source, as applicable) addresses:

```
configure syslog add [ipaddress {udp-port udp_port}|ipPort] {vr vr_name}
[local0...local7]
```

```
configure syslog delete [all | ipaddress {udp-port udp_port}| ipPort] {vr
vr_name}{local0...local7}
```

```
configure log target syslog [all | ipaddress {udp-port udp_port} |
ipPort] {vr vr_name} {local} from source-ip-address
```

```
[enable|disable] log target [ . . . | syslog [[all | ipaddress {udp-port
udp_port} | ipPort] {vr vr_name} {local}]]
```

```
configure log target syslog [ipaddress {udp-port udp_port} | ipPort] {vr
vr_name} [local] severity severity {only}
```

```
configure syslog [ipaddress {udp-port udp_port} | ipPort] {vr vr_name}
[local] severity severity {only}
```

```
configure log target [ . . . | syslog [all | ipaddress {udp-port
udp_port} | ipPort] {vr vr_name} {local}] match {any | regex}
```

```
configure log target syslog [all | ipaddress {udp-port udp_port} |
ipPort] {vr vr_name} {local} format
```

```
unconfigure log target [ . . . | syslog [all | ipaddress {udp-port
udp_port} | ipPort] {vr vr_name} {local} | . . . ] format
```

```
show log configuration {target { . . . | syslog {ipaddress {udp-port
udp_port} | ipPort} {vr vr_name} {local}} | filter {filter-name}}
```

MAC Authentication Delay

Currently, when both dot1x and MAC authentication methods are enabled on a port, a new MAC address detection triggers ExtremeXOS to send a RADIUS request to authenticate the new client on that port using MAC-based authentication. This feature allows you delay/bypass the MAC authentication by configuring a MAC authentication delay period on a per port basis. The MAC authentication delay period's default value is 0 seconds for backward compatibility, with a permissible range of 0 to 120 seconds.

Supported Platforms

- Summit X430, X440, X450-G2, X460, X460-G2, X480, X670, X670-G2, X770 series switches
- BlackDiamond X8 and 8000 series switches
- E4G-200 and E4G-400 cell site routers

Changed CLI Commands

Changes are underlined.

```
configure netlogin mac ports [port_list | all] timers [{reauth-period
[reauth_period]} {reauthentication [on|off]} {delay [delay]}]
```

The output of the `show netlogin` command now includes the authentication delay period value (shown in bold):

```
NetLogin Authentication Mode : web-based DISABLED; 802.1x DISABLED; mac-based DISABLED
NetLogin VLAN                : Not Configured
NetLogin move-fail-action    : Deny
NetLogin Client Aging Time   : 5 minutes
Dynamic VLAN Creation        : Disabled
Dynamic VLAN Uplink Ports    : None
Authentication Protocol Order: 802.1x, web-based, mac-based (default)
SNIPPED
-----
MAC Mode Global Configuration
-----
Re-authentication period      : 0 (Re-authentication disabled)
Authentication Database       : Radius, Local-User database
Authentication Delay Period : 0 (Default)
-----
Number of Clients Authenticated : 0
```

Configurable per Slot Link Aggregation Group (LAG) Member Port Distribution

Previously, ExtremeXOS switches would always distribute to all active members in a link aggregation group (LAG). This enhancement provides two options for specifying a subset of the active member ports as eligible for distribution on a per slot basis: “local slot distribution” and “distribution port lists”. The specific choice of configuration is described in the command line syntax as a “distribution-mode”. The choice of distribution mode is configurable per LAG. You may dynamically switch between distribution modes using the `configure sharing distribution-mode` command.

Local Slot Distribution

The “local-slot” distribution mode restricts distribution of unicast packets to the active LAG members on the same slot where the packet was received. If no active LAG members are present on the slot where the packet was received, all active LAG member ports are included in the distribution algorithm.

The “local-slot” distribution mode is useful for reducing the fabric bandwidth load of a switch. Reducing fabric bandwidth may be especially important for a SummitStack, which has significantly less fabric (inter-slot) bandwidth available in comparison to chassis switches. In many chassis or SummitStack hardware configurations, the “local-slot” distribution mode may reduce the switching latency of some flows distributed to a LAG.

Distribution Port Lists

The “port-lists” distribution mode configures one or more LAG member ports to be eligible for unicast LAG distribution on each slot in a switch. If a slot does not have a distribution port list configured or if none of the configured member ports is active in the LAG, all active member ports are eligible for unicast distribution.

The use of the “port-lists” distribution mode should be taken into consideration when adding ports to a LAG with the `configure sharing` command. Any newly added port on a LAG is not available for unicast distribution unless it is also added to the distribution port list of at least one slot.

Supported Platforms

- Summit X430, X440, X450-G2, X460, X460-G2, X480, X670, X670-G2, X770 series switches in stacks
- BlackDiamond X8 and 8000 series switches

Limitations

The distribution modes affect only the distribution of known unicast packets on a LAG. Non-unicast packets are distributed among all active members of a LAG.

Changed CLI Commands

Changes are underlined.

```
enable sharing master_port grouping member_port_list {algorithm [address-
based {L2 | L3 | L3_L4 | custom} | port-based]} {distribution-mode [all |
local-slot | portlists]} {lacp | health-check}
```

```
configure sharing master_port distribution-mode [all | local-slot | port-
lists]
```

```
configure sharing master_port slot slot distributionlist [port_list | add
port_list | delete [port_list] | all]
```

The `show sharing` and `show ports port_list sharing` commands now display the distribution mode for a LAG under the “Flag” column:

Distribution Mode Flags:

A - All: Distribute to all members

L - Local: Distribute to members local to ingress slot

P - Port Lists: Distribute to per-slot configurable subset of members

The `show sharing` and `show ports port_list sharing` commands now display the configured distribution mode and distribution port lists for LAGs:

```
show {ports port_list} sharing {distribution configuration}
```

```
Config Distribution Distribution
```

```
Master Mode Lists
```

```
=====
```

```
1:1 Port Lists Slot 1: 1:1-10, 1:15
```

```
Slot 5: 1:11-22
```

```
1:25 Local Slot Slot 1: 1:25
```

```
Slot 5: 1:26
```

```
5:1 Port Lists
```

```
5:10 All Slot 1: 5:11
```

```
Slot 5: 5:10
```

Port Customer VLAN ID (CVID) on Port-Based or Customer Edge Port (CEP) VMAN Service

This feature introduces an optional port customer VLAN ID (CVID) parameter to the existing untagged and CEP VMAN port configuration options. When present, any untagged packet received on the port is double tagged with the configured port CVID and the SVID associated with the VMAN. If the port is untagged, packets received with a single CID still have the SVID added. If the port is CEP, only untagged and any specifically configured CVIDs are allowed. As double tagged ports are received from tagged VMAN ports and forwarded to untagged VMAN ports, the SVID associated with the VMAN is stripped. Additionally, the CVID associated with the configured port CVID is also stripped in the same operation. If the port is CEP and CEP egress filtering is enabled, only the specified port CVID and CVIDs are allowed to egress.

Supported Platforms

- Summit X430, X440, X450-G2, X460, X460-G2, X480, X670, X670-G2, X770 series switches
- BlackDiamond X8 and 8000 series switches (except BD8K: G48Te2, G24Xc, G48Xc, G48Tc, 10G4Xc, 10G8Xc, S-G8Xc, S-10G1Xc, S-10G2Xc, and 8500-series)
- E4G-200 and E4G-400 cell site routers

Limitations

- Any limitations that currently exist with untagged VMAN ports also exist when the Port VLAN ID element is additionally applied.
- VPLS service VMANs are not allowed to have port-cvid configurations.

Changed CLI Commands

Changes are underlined>.

```
configure vman vman_name add ports [port_list | all] {tagged | untagged
{port-cvid port_cvid} | cep [ cvid cvid_first { - cvid_last } { translate
cvid_first_xlate { - cvid_last_xlate } } | port-cvid port_cvid ] }
```

```
configure vman vman_name ports [port_list | all] add [cvid cvid_first { -
cvid_last} {translate cvid_first_xlate { - cvid_last_xlate } } | port-cvid
port_cvid]
```

```
configure vman vman_name ports [port_list | all] delete [cvid cvid_first
{ - cvid_last } | port-cvid port_cvid]
```

```
configure vman vman_id add ports [port_list | all] {tagged | untagged
{port-cvid port_cvid} | cep [ cvid cvid_first { - cvid_last } {translate
cvid_first_xlate { - cvid_last_xlate } } | port-cvid port_cvid ] }
```

```
configure vman vman_id ports [port_list | all] add [cvid cvid_first { -
cvid_last} {translate cvid_first_xlate { - cvid_last_xlate}} | port-cvid
port_cvid]
```

```
configure vman [vman_id | vman_list] ports [port_list | all] delete [cvid
cvid_first { - cvid_last} | port-cvid port_cvid]
```

Graceful Restart and Not-So-Stubby Area (NSSA) Supported for Open Shortest Path First (OSPFv3)

This feature upgrades Open Shortest Path First (OSPFv3) to support graceful restart and Not-So-Stubby Area (NSSA):

- **Graceful OSPFv3 Restart**—RFC 5187 describes a way for OSPFv3 control functions to restart without disrupting traffic forwarding. Without graceful restart, adjacent routers assume that information previously received from the restarting router is stale and should not be used to forward traffic to that router. However, in many cases, two conditions exist that allow the router restarting OSPFv3 to continue to forward traffic correctly. The first condition is that forwarding can continue while the control function is restarted. Most modern router system designs separate the forwarding function from the control function so that traffic can still be forwarded independent of the state of the OSPFv3 function. Routes learned through OSPFv3 remain in the routing table and packets continue to be forwarded. The second condition required for graceful restart is that the network remain stable during the restart period. If the network topology is not changing, the current routing table remains correct. Often, networks can remain stable during the time for restarting OSPFv3.
- **NSSA**—NSSA is an extension of OSPFv3 stub area. External routes originating from an Autonomous System Boundary Router (ASBR) connected to an NSSA can be advertised within the area and can be advertised to other areas as autonomous system (AS)-external link-state advertisements (LSAs).

Supported Platforms

- Summit X450-G2, X460, X460-G2, X480, X670, X670-G2, and X770 series switches
- BlackDiamond X8 and 8000 series switches
- E4G-200 and E4G-400 cell site routers

New CLI Commands

```
configure ospfv3 lsa-batch-interval seconds
```

```
configure ospfv3 area area-identifier nssa [nosummary | summary] stub-  
defaultcost cost {translate}
```

```
configure ospfv3 restart [none | planned | unplanned | both]
```

```
configure ospfv3 restart grace-period seconds
```

```
configure ospfv3 [[vlan | tunnel] all | {vlan} vlan-name | {tunnel}  
tunnel-name | area area-identifier] restart-helper [none | planned |  
unplanned | both]
```

```
enable ospfv3 [[vlan | tunnel] all | {vlan} vlan-name | {tunnel} tunnel-  
name | area area-identifier] restart-helper-lsa-check
```

```
disable ospfv3 [[vlan | tunnel] all | {vlan} vlan-name | {tunnel} tunnel-  
name | area area-identifier] restart-helper-lsa-check
```

```
enable ospfv3 virtual-link {routerid} router-identifier {area} area-  
identifier restart-helper-lsa-check
```

```
disable ospfv3 virtual-link {routerid} router-identifier {area} area-  
identifier restart-helper-lsa-check
```

Changed CLI Commands

Changes are underlined.

```
configure ospfv3 area area_identifier add range ipv6netmask [advertise | noadvertise] [inter-prefix | nssa]
```

```
configure ospfv3 area area-identifier delete range ipv6Netmask [inter-prefix | nssa]
```

```
configure ospfv3 virtual-link {routerid} router-identifier {area} area-identifier restart-helper [none | planned | unplanned | both]
```

The following show commands now display additional information (shown in bold):

```
show ospfv3
```

```
OSPFv3           : Enabled           RouterId           : 10.1.1.1
RouterId Selection : Configured        ASBR               : No
ABR              : No                ExtLSAs           : 0
ExtLSAChecksum   : 0x0            OriginateNewLSAs  : 3
ReceivedNewLSAs  : 0                SpfHoldTime       : 10s
Num of Areas    : 1                10M Cost         : 100
100M Cost      : 50                1000M Cost (1G) :
40
10000M Cost (10G) : 20                40000M Cost (40G) : 20
100000M Cost (100G) : 10
Num of Areas    : 1                LSA Batch Interval : 30s
10M Cost       : 100                100M Cost         : 50
1000M Cost (1G) : 40                10000M Cost (10G) : 20
40000M Cost (40G) : 20                100000M Cost (100G) : 10
Router Alert   : Disabled
ASExternal LSALimit : Disabled        Timeout (Count)   : Disabled (0)
Originate Default : Disabled        Grace Period     : 120s
Graceful Restart : Both
Restart Status  : None
Last Restart Exit Reason: None
Import Policy File : none
Redistribute:
  Protocol      Status   Cost   Type  Tag   Policy
  direct        Disabled 20     2     ---  none
  e-bgp         Disabled 20     2     ---  none
  i-bgp         Disabled 20     2     ---  none
  ripng         Disabled 20     2     ---  none
  static        Disabled 20     2     ---  none
  isis-level-1  Disabled 20     2     ---  none
  isis-level-2  Disabled 20     2     ---  none
  isis-level-1-external Disabled 20     2     ---  none
  isis-level-2-external Disabled 20     2     ---  none
```

```
show ospfv3 interfaces detail
```

```
Interface       : v100           Enabled           : ENABLED
Router          : ENABLED        AreaID           : 0.0.0.0
RouterID       : 10.1.1.2    Link Type        : point-to-point
Passive        : No          Cost             : 40/A
Priority       : 1           Transit Delay     : 1s
Hello Interval : 10s          Rtr Dead Time    : 40s
Retransmit Interval : 5s        Wait Timer       : 40s
Interface ID   : 19         Instance ID      : 0
State          : P2P        Number of state chg : 1
Hello due in   : 7s          Number of events  : 2
```



```

Total Num of Nbrs      : 1                Nbrs in FULL State : 1
Hello Rxed             : 127733           Hello Txed          : 127739
DB Description Rxed    : 4                DB Description Txed : 3
LSA Request Rxed      : 1                LSA Request Txed   : 1
LSA Update Rxed       : 2121            LSA Update Txed    : 6156
LSA Ack Rxed          : 5962            LSA Ack Txed       : 2121
In Discards           : 0
DR RtId               : 0.0.0.0          BDR RtId           : 0.0.0.0
Restart Helper        : Both
Restart Helper Strict LSA Checking: Enabled
BFD Protection        : Off

```

```
show ospfv3 area detail
```

```

Area Identifier       : 1.0.0.0           Type                : NORM
Router ID            : 10.1.1.2           Num of Interfaces   : 1
Spf Runs             : 7                 Num ABRs            : 1
Num ASBRs            : 0                 Num DC-Bit LSAs    : 0
Num Indication LSAs : 0                 Num of DoNotAge LSAs: 0
Num LSAs             : 8                 LSA Chksum         : 0x4d0f7
Num ASBRs            : 1                 Num LSAs            : 2
Num Rtr LSAs         : 1                 Num Net LSAs        : 0
Num Inter-pref LSAs : 0                 Num Inter-rtr LSAs : 0
Num Intra-pref LSAs : 1                 Num NSSA LSAs       : 0
LSA Chksum           : 0xbe09
Num of Nbrs          : 1                 Num of Virtual Nbrs : 1
Interfaces:
Interface Name       Ospf State  DR ID          BDR ID
vlan101             E   BDR          3.0.0.0        2.0.0.0
Inter-Area route Filter: none
External route Filter : none
Configured Address Ranges:
Area: 0.0.0.1 Addr: 3100::/64 Type: 3 Advt: Yes
Addr: 3100::/64 Type: inter-prefix Advt: Yes
Addr: 3200::/64 Type: nssa           Advt: No

```

```
show ospfv3 area detail
```

```

Area Identifier       : 2.0.0.0           Type                : NSSA
Summary              : Yes               Default Metric      : 10
Translate            : Candidate (Elected)
Router ID            : 10.1.4.1           Num of Interfaces   : 1
Spf Runs             : 14                 Num ABRs            : 1
Num ASBRs            : 2                 Num LSAs            : 10
Num Rtr LSAs         : 2                 Num Net LSAs        : 1
Num Inter-pref LSAs : 4                 Num Inter-rtr LSAs : 0
Num Intra-pref LSAs : 1                 Num NSSA LSAs       : 2
LSA Chksum           : 0x3b142
Num of Nbrs          : 1                 Num of Virtual Nbrs : 0
Interfaces:
Interface Name       Ospf State  DR ID          BDR ID
vlan400             E   BDR          0.0.0.4        0.0.0.3
Inter-Area route Filter: none
External route Filter : none

```

```
show ospfv3 lsd area 0.0.0.2
```

```

Router LSA for Area 0.0.0.2
Link State ID      ADV Router      Seq#          Age    Checksum  #Links
-----
0.0.0.0            0.0.0.3            0x80000004   835    0x9b19    1
0.0.0.0            0.0.0.4            0x80000004   837    0x8431    1

```

```
Network LSA for Area 0.0.0.2
```

```

Link State ID    ADV Router      Seq#           Age    Checksum
-----
0.15.66.70      0.0.0.4        0x80000003    837   0x423c

                Inter Area Prefix LSA for Area 0.0.0.2

Link State ID    ADV Router      Seq#           Age    Checksum
-----
0.0.0.2         0.0.0.3        0x80000003    829   0x734d
0.0.0.3         0.0.0.3        0x80000003    829   0x5521
0.0.0.4         0.0.0.3        0x80000003    829   0x543
0.0.0.5         0.0.0.3        0x80000003    808   0x4560

                NSSA LSA for Area 0.0.0.2

Link State ID    ADV Router      Seq#           Age    Checksum  MetricType
-----
0.0.0.2         0.0.0.3        0x80000003    839   0x728f    type-1
0.0.0.8         0.0.0.4        0x80000003    898   0x5d7f    type-1

                Intra Area Prefix LSA for Area 0.0.0.2

Link State ID    ADV Router      Seq#           Age    Checksum  #Prefix  Reference
-----
0.1.0.0         0.0.0.4        0x80000005    838   0x6c9d    1        Network-LSA

```

```

show ospfv3 lsdbs stats
Interface vln100
-----
LSA Type          Count
-----
Link              2
Unknown          0

Interface vl
-----
LSA Type          Count
-----
Link              0
Unknown          0

Area ID 0.0.0.0
-----
LSA Type          Count
-----
Router            3
Network           1
Inter-Area-Prefix 7
Inter-Area-Router 1
NSSA            0
Intra-Area-Prefix 1
Unknown          0

Global
-----
LSA Type          Count
-----
AS External       1
Unknown          0

```

```
show ospfv3 lsdbs stats lstype router
```

```

Area ID 0.0.0.0
-----

```

| LSA Type | Count |
|--------------------------|----------|
| Router | 3 |
| Network | 0 |
| Inter-Area-Prefix | 0 |
| Inter-Area-Router | 0 |
| Intra-Area-Prefix | 0 |
| Unknown | 0 |

Deleted CLI Commands

```
show ospfv3 memory {detail | memoryType}
```

Secure Shell (SSH) Server Upgrade

OpenSSH server listens for incoming connections. After authenticating, the server provides the client either shell access or access to the CLI, or performs a file transfer of configuration files. The server uses various services in ExtremeXOS including AAA for authentication, Policy Manager for access control, Session Manager for session reporting, and EMS for logging.

SSHServer is migrated from SSH toolkit to OpenSSH, where the SSH server is added as part of the `exsshd` process. ExtremeXOS 16.2 supports SSH protocol version 2 from OpenSSH. Although the SSH server is added to `exsshd`, the key generation is not performed by `exsshd`. This is done separately by another module from OpenSSH, `ssh-keyGen`, which is invoked from `exsshd`. The generated key is stored in `/etc/ssh/ssh_host_dsa_key` and `/etc/ssh/ssh_host_dsa_key.pub`. The same format is used for any keys that are imported to OpenSSH.

Supported Platforms

- Summit X430, X440, X450-G2, X460, X460-G2, X480, X670, X670-G2, X770 series switches
- BlackDiamond X8 and 8000 series switches
- E4G-200 and E4G-400 cell site routers

Limitations

- Keyboard interactive authentication is not supported.
- Host key algorithms are not configurable.

Resiliency Enhancement for IPv4 and IPV6 Static Routes

The ExtremeXOS Resiliency Enhancement feature provides a resilient way to use Equal-Cost Multi-Path (ECMP) to load balance IPv4 traffic among multiple servers or other specialized devices. ExtremeXOS automatically manages the set of active devices using ECMP static routes configured with ping protection to monitor the health of these routes. Such servers or specialized devices do not require special software to support Bidirectional Forwarding Detection (BFD), or IP routing protocols such as OSPF, or proprietary protocols to provide keepalive messages. ExtremeXOS uses industry-standard and required protocols ICMP/ARP for IPv4 to accomplish the following automatically:

- Initially verify devices and activate their static routes, without waiting for inbound user traffic, and without requiring configuration of device MAC addresses.
- Detect silent device outages and inactivate corresponding static routes.
- Reactivate static routes after device recovery, or hardware replacement with a new MAC address.

ExtremeXOS previously supported similar protection and resiliency using BFD on IPv4 static routes. However, BFD can only be used when the local and remote device both support BFD.

Supported Platforms

- Summit X440, X450-G2, X460, X460-G2, X480, X670, X670-G2, and X770 series switches
- BlackDiamond X8 and 8000 series switches
- E4G-200 and E4G-400 cell site routers

New CLI Commands

```
configure iproute add [default | ipv4_or_ipv6_network] gateway
{protection [bfd | ping | none]}
```

```
configure iproute {ipv4 | ipv6} protection ping interval seconds miss
misses
```

```
enable iproute {ipv4 | ipv6} protection ping
```

```
disable iproute {ipv4 | ipv6} protection ping
```

```
show iproute {ipv4 | ipv6} protection ping {v4_or_v6_gateway} {vr vr_name}
{detail}
```

Changed CLI Commands

The following are revised commands for the ExtremeXOS Resiliency Enhancement for IPv4 and IPv6 Static Routes feature:

- The configuration settings for static route ping protection enable/disable, interval, and misses for IPv4 appear in the `show ipconfig` command, and for IPv6 in the `show ipconfig ipv6` command.
- A new route flag letter "I" appears in the `show iproute` and `show ipconfig ipv6` commands to indicate static routes with ICMP ping protection. Flag letter "I" uses the same column as flag letter "b" because BFD and ping protection are mutually exclusive. If the route flags also show "U" for Up, then ping protection detected the gateway is up.

ExtremeXOS Applications Environment

ExtremeXOS 16.2 introduces an environment that allows management applications, controllable through a web interface, to communicate directly with other switch management applications.

Applications are management software modules that manage, configure, or monitor specific functions within a switch. The applications leverage existing ExtremeXOS capabilities and protocols to simplify complex tasks. You may download applications to a switch independently from an ExtremeXOS release (see [ezServiceability \(File Upload/Download\)](#) on page 30).

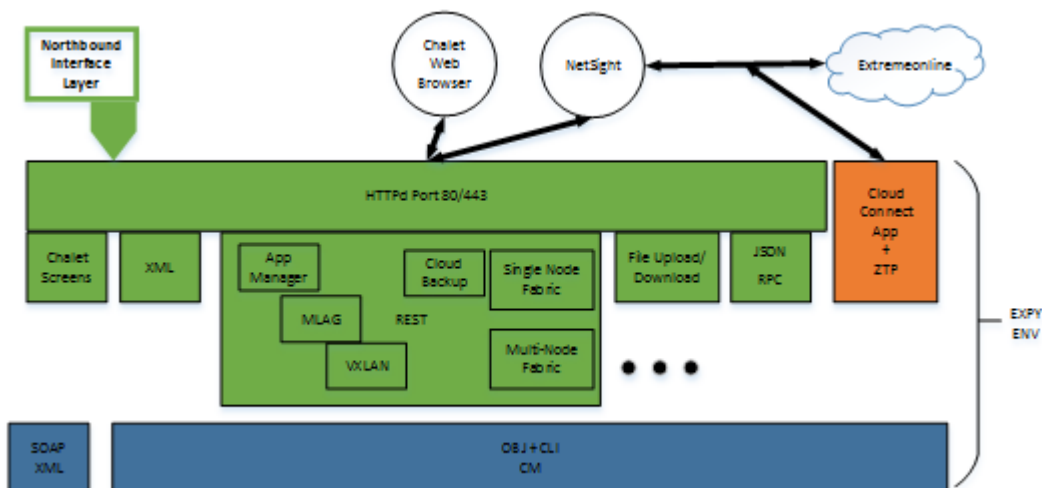


Figure 1: Application Environment Block Diagram

The HTTP interface is now a Python application based on CherryPy (3.7.0). This environment includes the following previously available interfaces:

- Web interface (Chalet)
- SOAP/XML interface

Additionally, the following new capabilities have been introduced with ExtremeXOS 16.2:

- Service applications.
- File upload/download (see [ezServiceability \(File Upload/Download\)](#) on page 30)
- JSONRPC—provides a management automation interface (<http://www.jsonrpc.org/specification>). The JSONRPC implementation supports two methods:
 - CLI method—issues CLI commands to ExtremeXOS show commands and returns JSON data instead of formatted CLI data.
 - Python method—allows the remote system to send inline Python scripts to run on a switch. You can use inline Python scripting to perform complex tasks not available using the ExtremeXOS CLI.
- Configuration applications.
- Application manager—provides the ability to dynamically add management applications at run time. Applications may be developed independently from the ExtremeXOS release cycle.
- ezMLAG—works with Chalet web screens and peer switches. It can communicate with peer switches to perform the complex task of setting up and maintaining MLAG configurations.
- VXLAN—works with Chalet to manage VXLAN configuration coordination across multiple switches.

Supported Platforms

- Summit X430, X440, X450-G2, X460, X460-G2, X480, X670, X670-G2, X770 series switches
- BlackDiamond X8 and 8000 series switches
- E4G-200 and E4G-400 cell site routers

ezServiceability (File Upload/Download)

ezServiceability is a web application that enables you to upload and download files to and from a switch instead of setting up a separate TFTP server. You can use this feature to push a new ExtremeXOS image to a switch directly when upgrading.

- The `app/file/<path>` URL provides the ability to send, retrieve, or delete files on a switch. The `<path>` parameter accepts the ExtremeXOS paths:
 - `/usr/local/cfg`
 - `/usr/local/tmp`
 - `/usr/local/ext`—Files located on a USB memory stick, if present.

The allowed file extensions for `<path>` are: `pol`, `cfg`, `xcf`, `py`, `pkt`, and `xml`.

- The `app/file/cfg` URL is a shortcut for files in the `/usr/local/cfg` directory.

For example, `http://<ip>/app/file/usr/local/cfg/myfile.py` is equivalent to `http://<ip>/app/file/cfg/myfile.py`. Upgrading a switch with a new ExtremeXOS image is covered using the `app/upload` interface. Use this interface in concert with the `app/filelist`, which provides the following capabilities:

- Obtain the list of files on the switch.
- Determine which file operations are supported for each file.

This interface is useful for:

- Sending policy, script, or config files to a switch directly from a web browser.
- Retrieving files from a switch directly to a web browser, such as configuration files.
- Retrieving/editing/returning files to a switch (provides a user-friendly way of editing files).
- Deleting files on a switch.

Universal Port Management (UPM) on Summit X430 Series Switches

Support for Universal Port Management (UPM) is now extended to the Summit X430 series switches.

ExtremeXOS 16.2 Software Image Changes

The following information details changes to the ExtremeXOS 16.2 software image.

ExtremeXOS Images for BlackDiamond 8000 Series Switches

Due to additional functionality, the ExtremeXOS 16.2 and later software image is too large to download onto the BlackDiamond 8000 series switches. To resolve this issue, the diagnostics for the BlackDiamond 8900 I/O modules is now a separate image file (XMOD) in addition to the main software image file.

Table 3: BlackDiamond 8000 Series Switches Software Image Files

| | Main Install image | Diagnostic image |
|--------------------|---|---|
| Content | All BlackDiamond 8000 content (except BlackDiamond 8900 I/O module diagnostics) | BlackDiamond 8900 I/O module diagnostics |
| File Name | <code>bd8800-16.2.xx.yy.xos</code> | <code>bd8800-16.2.xx.yy-8900diags.xmod</code> |
| File Type | Standard ExtremeXOS image | XMOD image |
| Installation Notes | Other XMODs can be used with the BlackDiamond 8000 main ExtremeXOS image. | To update to a newer version of the diagnostics, you download and install the latest XMOD version. The diagnostics XMOD can be installed to the active or standby partition and diagnostics can be used immediately. There is no need to reboot or execute any other action to complete the installation. |

The following scenarios produce an error or warning message:

- Attempting to run the diagnostic command on any BlackDiamond 8900 I/O module without the diagnostic image installed.
- Not having the diagnostic image installed (when system initializes).
- Installing the main BlackDiamond 8000 image without the diagnostics image present.

ExtremeXOS Images for Summit X480 Series Switches

Due to additional functionality and new platforms supported, the ExtremeXOS 15.6 and later software image is too large to download onto the Summit X480 series switches. To resolve this issue, Summit X480 series switches now have two separate software image files used for both individual switches and stacks that include Summit X480 series switches.

Table 4: Summit X480 Series Switches Software Image Files

| | Main Install image | Diagnostic image |
|--------------------|---|---|
| Content | All Summit X480 content (except diagnostics) | Summit X480 diagnostics |
| File Name | <code>summitx480-16.2.xx.yy.xos</code> | <code>summitx480-16.2.xx.yy-diagnostics.xmod</code> |
| File Type | Standard ExtremeXOS image | XMOD image |
| Installation Notes | <ul style="list-style-type: none"> • Installing the main SummitX480 image over a previous release leaves the previous installation of the diagnostics image intact, as it is stored separately from the main ExtremeXOS image. You can continue to use the previously installed diagnostic version to run diagnostics. • Other Summit XMODs can be used with the Summit X480 main ExtremeXOS image. | To update to a newer version of the diagnostics, download and install the latest XMOD version. The diagnostics XMOD can be installed to the active or standby partition and diagnostics can be used immediately. There is no need to reboot or execute any other action to complete the installation. |

The following scenarios produces an error or warning message:

- Attempting to run the diagnostic command without the diagnostic image installed.
- Not having the diagnostic image installed on a Summit X480 series switch or slot (when system initializes).
- Installing the main Summit X480 image without the diagnostics image present.
- Installing the general Summit image (summitX-16.2.xx.yy.xos, rather than the Summit X480-specific image) on a Summit X480 series switch.



Note

If Summit X480 series switches require rescue recovery, you can use the `summitX-16.2.xx.yy.xos` file image, and this image installs the diagnostics capability.

SSH Included in ExtremeXOS Base Image

SSH is now included in the ExtremeXOS base image starting with ExtremeXOS 16.2. A separate XMOD file is no longer required.

New Hardware Supported in ExtremeXOS 16.2

This section lists the new hardware supported in ExtremeXOS 16.2:

- BD 8800 MSM-96 module (also supported in ExtremeXOS 16.1.3)

The following transceivers are now supported in ExtremeXOS 16.2:

- 10335 40Gb ER4 QSFP+
- 10334 40Gb LM4 QSFP+
- 10329 40Gb MMF Bidirectional QSFP+
- 10325 10Gb Tunable DWDM SFP+
- 10GB-BX10-D 10Gb Bidirectional SFP+
- 10GB-BX10-U 10Gb Bidirectional SFP+

For a full list of supported platforms see [Extreme Hardware/Software Compatibility and Recommendation Matrices](#).

For transceiver specifications, see [Extreme Networks Pluggable Transceivers Installation Guide](#).

Vulnerability Notice

The following section lists potential vulnerabilities and their impact to ExtremeXOS 16.2.4-Patch1-3.

Escape from exsh Restricted Shell (CVE-2017-14331)

This issue is documented in CR xos0069140, which is fixed in ExtremeXOS 16.2.4 (see [Resolved Issues in ExtremeXOS 16.2.4](#) on page 85).



Important

You must enable FIPS for this fix to take effect.

| | |
|-----------------------|--|
| Impact | Escape from exsh restricted shell |
| Attack Vector | local |
| CVS base score | 5.1 (CVSS:3.0/AV:L/AC:L/PR:H/UI:N/S:U/C:H/I:L/A:N) |
| Description | An authenticated user with admin privileges can spawn an interactive shell on the system. |
| Detail | A user with admin privileges on the switch can invoke an interactive shell with access to the underlying operating system. |

Information Disclosure (CVE-2017-14327)

This issue is documented in CR xos0069140, which is fixed in ExtremeXOS 16.2.4 (see [Resolved Issues in ExtremeXOS 16.2.4](#) on page 85).



Important

You must enable FIPS for this fix to take effect.

| | |
|-----------------------|--|
| Impact | Information disclosure |
| Attack Vector | local |
| CVS base score | 5.1 (CVSS:3.0/AV:L/AC:L/PR:H/UI:N/S:U/C:H/I:L/A:N) |
| Description | An authenticated user with admin privileges can get read access for any file on the filesystem. |
| Detail | By obtaining an interactive shell with admin privileges as defined in CVE-2017-14331 (preceding), you can access system files owned by root and without world read-access. |

Privilege Escalation (root interactive shell) (CVE-2017-14329)

This issue is documented in CR xos0069140, which is fixed in ExtremeXOS 16.2.4 (see [Resolved Issues in ExtremeXOS 16.2.4](#) on page 85).



Important

You must enable FIPS for this fix to take effect.

| | |
|-----------------------|--|
| Impact | Privilege escalation (root interactive shell) |
| Attack Vector | local |
| CVS base score | 6.7 (CVSS:3.0/AV:L/AC:L/PR:H/UI:N/S:U/C:H/I:H/A:H) |
| Description | An authenticated user with admin privileges can get an interactive root shell on the switch. |
| Detail | By exploiting both CVE-2017-1427 and CVE-2017-14331, you can escalate to root by spawning a new exsh shell in debug mode and invoking an interactive shell with root privileges. |

Privilege Escalation (root interactive shell) (CVE-2017-14330)

This issue is documented in CR xos0069140, which is fixed in ExtremeXOS 16.2.4 (see [Resolved Issues in ExtremeXOS 16.2.4](#) on page 85).



Important

You must enable FIPS for this fix to take effect.

| | |
|------------------------|---|
| Impact | Privilege escalation (root interactive shell) |
| Attack Vector | local |
| CVSS base score | 6.7 (CVSS:3.0/AV:L/AC:L/PR:H/UI:N/S:U/C:H/I:H/A:H) |
| Description | An authenticated user with admin privileges can get an interactive root shell on the platform. |
| Detail | You can get an interactive root shell on the switch by creating a process that runs with elevated privileges. |

Denial-of-Service (CVE-2017-14328)

This issue is documented in CR xos0069140, which is fixed in ExtremeXOS 16.2.4 (see [Resolved Issues in ExtremeXOS 16.2.4](#) on page 85).

| | |
|------------------------|---|
| Impact | Denial-of-service |
| Attack Vector | remote |
| CVSS base score | 7.5 (CVSS:3.0/AV:N/AC:L/PR:N/UI:N/S:U/C:N/I:N/A:H) |
| Description | A remote user can force the switch to reboot by sending a single, specially crafted packet to the web server. |

Session Hijacking (CVE-2017-14332)

This issue is documented in CR xos0069140, which is fixed in ExtremeXOS 16.2.4 (see [Resolved Issues in ExtremeXOS 16.2.4](#) on page 85).

| | |
|------------------------|--|
| Impact | Session hijacking |
| Attack Vector | remote |
| CVSS base score | 9.6 (CVSS:3.0/AV:N/AC:L/PR:N/UI:R/S:C/C:H/I:H/A:H) |
| Description | A remote user can hijack a session on the switch web server. |
| Detail | A remote user can hijack a session on the switch web server by using non-trivial methods to determine the SessionIDs used in authentication. |

SSL 64-bit Block Size Cipher Suites Supported (SWEET32)

We do not believe that ExtremeXOS 16.2.4-Patch1-3 is significantly vulnerable to the “SSL 64-bit Block Size Cipher Suites Supported” (SWEET32) security risk.

For SSL, ExtremeXOS uses the thttpd webserver that is not vulnerable to this type of attack because thttpd does not support persistent SSL connections, which is a requirement of the exploit.

For more information about the SWEET32 threat, see:

<https://sweet32.info>

<https://www.openssl.org/blog/blog/2016/08/24/sweet32/>

ExtremeXOS CLI Command Output Format Changes

The following information details format changes to the output of some ExtremeXOS 16.2 CLI commands.

VLAN Option Formatting in Commands

For commands with a **vlan_list** option, the input into this option must not contain spaces.

Example

The `enable stpd auto-bind` command VLAN ID input should be entered as:

```
enable stpd auto-bind vlan 10,20-30
```

Not:

```
enable stpd auto-bind vlan 10, 20-30
```

Output Change for Show FDB Command

The output of the `show fdb` command now accommodates longer VLAN names (32 characters long) and includes the VID, with the following additional formatting changes:

- VID and Age values are right justified.
- Age value leading zeros are removed.
- Age column is now six characters wide.

Old Output

| Mac | Vlan | Age | Flags | Port / Virtual Port List |
|-------------------|------|------|-------|--------------------------|
| 00:00:5e:00:01:01 | v123 | 0000 | d mi | S 10 |
| 00:04:96:7e:13:7c | v123 | 0000 | s m | S 10 |
| 00:04:96:7e:13:7c | v123 | 0000 | s m | S 10 |

New Output

| MAC | VLAN | VID | Age | Flags | Port/Virtual Port List |
|-------------------|---------------|------|-----|-------|------------------------|
| 00:00:00:00:00:01 | 32 characters | 1234 | 0 | spm | 11 |
| 00:00:00:00:00:01 | v123 | 123 | 46 | d m | L 5 |
| 00:00:00:00:00:02 | v123 | 123 | 46 | d m | L 5 |
| 00:00:00:00:00:03 | v123 | 123 | 46 | d m | L 5 |

CLI Command Output Format of Ports Lists

For ExtremeXOS 16.1 and later, the output of CLI commands showing ports lists does not display spaces between commas.

For example: “3:1,7:13” instead of “3:1, 7:13”

Circuit Emulation Service (CES) No Longer Supported

Starting with ExtremeXOS 16.2, Circuit emulation service (CES) is no longer supported.

ExtremeXOS SSH Server Upgraded with OpenSSH v6.5

ExtremeXOS 16.1 and earlier versions generated DSA-2048 keys using `ssh-keygen` provided by the SSH-Toolkit library. Starting with ExtremeXOS 16.2, ExtremeXOS generates more secure RSA-2048 keys due to switching to using the OpenSSH library, which does not support DSA-2048.

When upgrading to ExtremeXOS 16.2 and later, SSH keys generated by earlier ExtremeXOS versions (16.1 and earlier) are compatible and do *not* need to be re-generated.



Note

If a switch is downgraded from ExtremeXOS 16.2 or later to previous releases, with RSA key saved, the key becomes invalid.

OpenFlow No Longer Supported on SummitStack

For Extreme 16.2 and later, OpenFlow is not supported on SummitStack.

Extreme Hardware/Software Compatibility and Recommendation Matrices

The *Extreme Hardware/Software Compatibility and Recommendation Matrices* provide information about the minimum version of ExtremeXOS software required to support switches, as well as pluggable transceivers and cables.

This guide also provides information about which optics are supported on which hardware platforms, and the minimum software version required.

The latest version of this and other ExtremeXOS guides are at: <http://documentation.extremenetworks.com>

Compatibility with Extreme Management Center (Formerly NetSight)

ExtremeXOS 16.2.4-Patch1-3 is compatible with Extreme Management Center (formerly NetSight) version 6.3.0.182 and later.

Upgrading ExtremeXOS

For instructions about upgrading ExtremeXOS software, see “Software Upgrade and Boot Options” in the *ExtremeXOS 16.2 User Guide*.

Beginning with ExtremeXOS 16.2, an ExtremeXOS core image (.xos file) must be downloaded and installed on the alternate (non-active) partition. If you try to download to an active partition, the error message **Error: Image can only be installed to the non-active partition.** appears. An ExtremeXOS modular software package (.xmod file) can still be downloaded and installed on either the active or alternate partition.

Supported MIBs

The Extreme Networks MIBs are located at <http://www.extremenetworks.com/support/policies/mibs/>.

You need to provide your serial number or agreement number, and then the MIBs are available under each release.

For detailed information on which MIBs and SNMP traps are supported, see the *Extreme Networks Proprietary MIBs* and *MIB Support Details* sections in the *ExtremeXOS 16.2 User Guide*.

Tested Third-Party Products

This section lists the third-party products tested for ExtremeXOS .

Tested RADIUS Servers

The following RADIUS servers are fully tested:

- Microsoft—Internet Authentication Server
- Meetinghouse
- FreeRADIUS

Tested Third-Party Clients

The following third-party clients are fully tested:

- Windows 7
- Windows Vista
- Linux (IPv4 and IPv6)
- Windows XP (IPv4)

PoE Capable VoIP Phones

The following PoE capable VoIP phones are fully tested:

- Avaya 4620
- Avaya 4620SW IP telephone
- Avaya 9620
- Avaya 4602
- Avaya 9630
- Avaya 4621SW
- Avaya 4610
- Avaya 1616

- Avaya one-X
- Cisco 7970
- Cisco 7910
- Cisco 7960
- ShoreTel ShorePhone IP 212k
- ShoreTel ShorePhone IP 560
- ShoreTel ShorePhone IP 560g
- ShoreTel ShorePhone IP 8000
- ShoreTel ShorePhone IP BB 24
- Siemens OptiPoint 410 standard-2
- Siemens OpenStage 20
- Siemens OpenStage 40
- Siemens OpenStage 60
- Siemens OpenStage 80

Extreme Switch Security Assessment

DoS Attack Assessment

Tools used to assess DoS attack vulnerability:

- Network Mapper (NMAP)

ICMP Attack Assessment

Tools used to assess ICMP attack vulnerability:

- SSPing
- Twinge
- Nuke
- WinFreeze

Port Scan Assessment

Tools used to assess port scan assessment:

- Nessus

Service Notifications

To receive proactive service notification about newly released software or technical service communications (for example, field notices, product change notices, etc.), please register at:

www.extremenetworks.com/support/service-notification-form

2 Limits

This chapter summarizes the supported limits in ExtremeXOS 16.2.4-Patch1-3.

[Table 5](#) on page 40 summarizes tested metrics for a variety of features, as measured in a per-system basis unless otherwise noted. These limits may change, but represent the current status. The contents of this table supersede any values mentioned in the ExtremeXOS books.



Note

The term “BlackDiamond 8000 e-series” refers to all BlackDiamond 8500 e-series and 8800 e-series modules. The term “BlackDiamond 8000 series” refers to all BlackDiamond 8500, 8800, and 8900 series modules.

The scaling and performance information shown in [Table 5](#) is provided for the purpose of assisting with network design. It is recommended that network architects and administrators design and manage networks with an appropriate level of network scaling “head room.” The scaling and performance figures provided have been verified using specific network topologies using limited switch configurations. There is no guarantee that the scaling and performance figures shown are applicable to all network topologies and switch configurations and are provided as a realistic estimation only. If you experience scaling and performance characteristics that you feel are sufficiently below what has been documented, contact Extreme Networks technical support for additional assistance.

The route limits shown in [Table 5](#) for IPv4 and IPv6 routing protocols are software limits only. The actual hardware limits may be higher or lower than the software limits, based on platform. The hardware limits for specific platforms are specified as “IPv4/IPv6 routes (LPM entries in hardware)” in the following table.

On products other than the BlackDiamond 8900 xl-series, BlackDiamond X8 series, and Summit X480 series, it is not advised to have greater than 25,000 total IP routes from all routing protocols. Adverse effects can occur with routing tables larger than this, especially when a single network event or CLI command affects a significant number of routes. For example, just after such a network event, the added system load will cause a save configuration command to time out.

Table 5: Supported Limits

| Metric | Product | Limit |
|--|--|---|
| AAA (local) —maximum number of admin and local user accounts. | All platforms | 8 |
| Access lists (meters) —maximum number of meters. | BlackDiamond 8000 series e-series, group of 24 ports c-series BlackDiamond 8900 series 8900-10G24X-c, group of 12 ports 8900 xl-series, 8900-G96T-c 8900-40G6X-xm BlackDiamond X8 a-series modules BlackDiamond X8-100G4X and BDX X8-100G4X-XL modules BlackDiamond BDXB-40G12X-XL per group of 3 ports E4G-200 Summit X440, X430 per group of 24 ports Summit X460, E4G-400, per group of 24 ports Summit X480 Summit X670 with VIM4-40G4x Summit X480 with VIM3-40G4X Summit X460-G2, X450-G2, X770, X670-G2 | 512 2,048 ingress, 256 egress 1,024 ingress, 256 egress 4,096 ingress, 512 egress 512 ingress, 512 egress 512 ingress, 512 egress 8,192 ingress, 1,024 egress 8,192 ingress, 1,024 egress 1,024 ingress 256 egress 512 ingress 2,048 ingress, 256 egress 4,096 ingress, 512 egress 512 ingress, 512 egress 512 ingress, 512 egress 1,024 ingress, 512 egress |
| Access lists (policies) —suggested maximum number of lines in a single policy file. | All platforms | 300,000 |

Table 5: Supported Limits (continued)

| Metric | Product | Limit |
|---|---|--|
| Access lists (policies)— maximum number of rules in a single policy file. ^a | BlackDiamond 8000 series e-series, group of 24 ports c-series | 4,096 ingress, 512 egress 1,024 ingress |
| | BlackDiamond 8900 series 8900-10G24X-c, group of 12 ports 8900 xl-series 8900-40G6X-xm | 2,048 ingress, 512 egress 8,192 ingress, 1,024 egress 61,440 (up to) |
| | BlackDiamond X8 a-series modules | 2,048 ingress, 1,024 egress |
| | BlackDiamond X8-100G4X and BDX X8-100G4X-XL modules | 8,192 ingress, 1,024 egress |
| | BlackDiamond BDXB-40G12X-XL per group of 3 ports | 8,192 ingress, 1,024 egress |
| | E4G-200 | 2,048 ingress 512 egress |
| | Summit X440, X430 per group of 24 ports | 1,024 ingress 4,096 ingress, 512 egress |
| | E4G-400, per group of 24 ports | 8,192 ingress, 1,024 egress |
| | Summit X480, X460 | 2,048 ingress, 1,024 egress |
| | Summit X670 with VIM4-40G4x | 1,024 ingress, 1,024 egress |
| | Summit X480 with VIM3-40G4X | 2,048 ingress, 1,024 egress |
| | Summit X460-G2, X450-G2 | 4,096 ingress, 1,024 egress |
| | Summit X770, X670-G2 | 4,096 ingress, 1,024 egress |
| Access lists (policies)— maximum number of rules in a single policy file in first stage (VFP). | Summit X450-G2, X460-G2, X460, X480, E4G-400 | 2,048 ingress only |
| | Summit X670-G2, X770, E4G200, X670 | 1,024 ingress only |

Table 5: Supported Limits (continued)

| Metric | Product | Limit |
|--|---|---|
| Access lists (slices)—number of ACL slices. | BlackDiamond 8000 series c-series, group of 48 ports | 16 |
| | BlackDiamond 8900 series 8900 xl-series 8900-10G24X-c modules, group of 12 ports 8900-G96T-c modules, group of 48 ports 8900-40G6X-xm | 17 ^b 12 ingress, 4 egress 16 ingress, 4 egress 10 ingress, 4 egress |
| | BlackDiamond X8 a-series modules | 10 ingress, 4 egress |
| | BlackDiamond X8-100G4X modules | 16 ingress, 4 egress |
| | BlackDiamond XB-100G4X-XL modules | 17 ingress, 4 egress |
| | E4G-200 | 8 ingress, 4 egress |
| | Summit X440, X430 Summit X460, E4G-400, X460-G2, X450-G2 | 4 ingress 16 ingress, 4 egress |
| | Summit X480 | 17 ingress ^b , 4 egress |
| | Summit X670 VIM4-40G4x | 10 ingress, 4 egress |
| | Summit X480 VIM3-40G4X Summit X770, X670-G2 | 10 ingress, 4 egress 12 ingress, 4 egress |
| Access lists (slices)—number of ACL slices in first stage (VFP). | Summit X450-G2, X460-G2, X670-G2, X770, E4G-200, E4G-400, X460, X480, X670 | 4 ingress only |
| ACL Per Port Meters—number of meters supported per port. | E4G-200 | 8 |
| | E4G-400 | 16 |
| | BlackDiamond X8, BlackDiamond 8800 | 16 |
| | Summit X430, X440 | 8 |
| | Summit X450-G2, X460, X460-G2, X480, X670, X670-G2, X770 | 16 |
| Meters Packets-Per-Second Capable | BlackDiamond X8, BlackDiamond 8800 (8900-40G6X-c only) | Yes |
| | E4G-200, E4G-400 | Yes |
| | Summit X480 | No |
| | Summit X430, X440, X450-G2, X460, X460-G2, X670, X670-G2, X770 | Yes |
| | | |

Table 5: Supported Limits (continued)

| Metric | Product | Limit |
|---|--|--|
| AVB (audio video bridging) —maximum number of active streams. Note: * It is recommended that you do not use on more than 8 ports on this switch. | Summit X440, X460, X460-G2, X450-G2 Summit X670, X670-G2 Summit X430 | 1,024 4,096 100* |
| BFD sessions —maximum number of software BFD sessions. | All platforms (default timers—1 sec) BlackDiamond X8 and 8800 (minimal timers—50 msec) All Summits, except X460-G2 (minimal timers—100 msec) Summit X460-G2 | 512 10 ^c 10 ^c 900 (if PTP feature not enabled) 425 (with PTP enabled) 256 (with 3 ms transmit interval) |
| BGP (aggregates) —maximum number of BGP aggregates. | All platforms (except E4G-200, X430, X440, and X450-G2) with Core license or higher | 256 |
| BGP (networks) —maximum number of BGP networks. | All platforms (except E4G-200, X430, X440, and X450-G2) with Core license or higher BlackDiamond X8 series | 1024 |
| BGP (peers) —maximum number of BGP peers. Note: *With default keepalive and hold timers. | BlackDiamond X8 series, xl-series, 8000 series All Summits, except X450-G2, X480, X440, X430, E4G-200 E4G-400H Summit X480 | 512 128* 128* 512 |
| BGP (peer groups) —maximum number of BGP peer groups. | BlackDiamond 8900 series BlackDiamond 8800 BlackDiamond X8 series Summit X480 Summit X770, X670-G2, X670v-48t, X670, X460-G2, X460 (with Core license or higher) | 128 64 128 128 64 |
| BGP (policy entries) —maximum number of BGP policy entries per route policy. | All platforms (except E4G-200, X430, X440, and X450-G2) with Core license or higher | 256 |
| BGP (policy statements) —maximum number of BGP policy statements per route policy. | All platforms (except E4G-200, X430, X440, and X450-G2) with Core license or higher | 1,024 |
| BGP multicast address-family routes —maximum number of multicast address-family routes. | BlackDiamond 8900 xl-series BlackDiamond X8 series BlackDiamond X8-xl series Summit X480 E4G-400 Summit X460, X460-G2, X670, X670-G2, X770 | 524,256 (up to) ^b 1,048,544 (up to) ⁱ 524,256 (up to) ^b 25,000 25,000 |

Table 5: Supported Limits (continued)

| Metric | Product | Limit |
|--|--|--|
| BGP (unicast address-family routes) —maximum number of unicast address-family routes. | BlackDiamond 8900 xl-series BlackDiamond X8 series BlackDiamond X8-xl series Summit X480 E4G-400 Summit X460, X460-G2, X670, X670-G2, X770 | 524,256 (up to) ^b 1,048,544 (up to) ⁱ 524,256 (up to) ^b 25,000 25,000 |
| BGP (non-unique routes) —maximum number of non-unique BGP routes. | BlackDiamond 8900 xl-series, X8 xl-series BlackDiamond X8 series BlackDiamond X8 xl-series Summit X460, X460-G2, X670, X670-G2, X770 Summit X480 E4G-400 | 1,200,000 24,000 2,000,000 25,000 1,000,000 25,000 |
| BGP ECMP —maximum number of equalcost multipath for BGP and BGPv6. | All platforms, except Summit X430, X440, and E4G-200 BlackDiamond 8800 G48Te2 (for BGPv6) Summit X450-G2 | 2, 4, or 8 N/A N/A |
| BGPv6 (unicast address-family routes) —maximum number of unicast address family routes. | BlackDiamond 8900 xl-series, BlackDiamond X8 xl-series BlackDiamond 8800 c-series BlackDiamond 8000 e-series BlackDiamond X8 series Summit X460, X460-G2 Summit X480 Summit X670, X670-G2, X770 E4G-400 | 20,000 6,000 240 8,000 6,000 20,000 8,000 6,000 |
| BGPv6 (non-unique routes) —maximum number of non-unique BGP routes. | BlackDiamond 8900 xl-series BlackDiamond 8800 c-series BlackDiamond 8000 e-series BlackDiamond X8 series, X8 xl-series Summit X460, X460-G2 Summit X670, X670-G2, X770 E4G-400 | 24,000 18,000 720 24,000 18,000 24,000 18,000 |
| BOOTP/DHCP relay —maximum number of BOOTP or DHCP servers per virtual router. | All platforms, except Summit X430 | 4 |
| BOOTP/DHCP relay —maximum number of BOOTP or DHCP servers per VLAN. | All platforms, except Summit X430 | 4 |
| Connectivity fault management (CFM) —maximum number of CFM domains. Note: With Advanced Edge license or higher. | All platforms | 8 |

Table 5: Supported Limits (continued)

| Metric | Product | Limit |
|--|--|--|
| CFM—maximum number of CFM associations. Note: With Advanced Edge license or higher. | All platforms | 256 |
| CFM—maximum number of CFM up end points. Note: With Advanced Edge license or higher. | BlackDiamond 8000 series, X8 series Summit series | 32 |
| CFM—maximum number of CFM down end points. Note: With Advanced Edge license or higher. | BlackDiamond 8000 series, X8 series Summit series X460, E4G-200, E4G-400 (non-load shared ports) Summit X460-G2 All other platforms | 32 256 (non-load shared ports), 32 (load shared ports) 256 (non-load shared ports), 32 (load shared ports) 32 |
| CFM—maximum number of CFM remote end points per up/down end point. Note: With Advanced Edge license or higher. | All platforms | 2,000 |
| CFM—maximum number of dot1ag ports. Note: With Advanced Edge license or higher. | All Summits, except X430, X450-G2 | 128 |
| CFM—maximum number of CFM segments. Note: With Advanced Edge license or higher. | All platforms | 1,000 |
| CFM—maximum number of MIPs. Note: With Advanced Edge license or higher. | All platforms | 256 |

Table 5: Supported Limits (continued)

| Metric | Product | Limit |
|--|--|---|
| CLEAR-Flow —total number of rules supported. The ACL rules plus CLEAR-Flow rules must be less than the total number of supported ACLs. | BlackDiamond X8, BlackDiamond 8800 | 4,096 |
| | Summit X440, X430 | 1,024 |
| | Summit X670 | 2,048 |
| | Summit X460, X460-G2, X770, X670-G2, X450-G2 | 4,094 |
| | Summit X480 | 8,192 |
| | E4G-200 E4G-400 | 2,048 4,094 |
| Data Center Bridging eXchange (DCBX) protocol Type Length Value (TLVs) —maximum number of DCBX application TLVs. | All platforms | 8 |
| DHCPv6 Prefix Delegation Snooping —Maximum number of DHCPv6 prefix delegation snooped entries. | All platforms | 256 (with Underlying Protocol Ripng) 128 (with Underlying protocol OSPFv3) 1,024 (with static routes) |
| DHCP snooping entries —maximum number of DHCP snooping entries. | All Summits BlackDiamond X8 | 2,048 6,000 |
| Dynamic ACLs —maximum number of ACLs processed per second. Note: Limits are load dependent. | Summit X480, X670 with 50 DACLs with 500 DACLs | 10 5 |
| | BlackDiamond X8 | N/A |
| | BlackDiamond 8800 | N/A |
| EAPS domains —maximum number of EAPS domains. Note: An EAPS ring that is being spatially reused cannot have more than four configured EAPS domains. | BlackDiamond 8000 series, X8 series | 64 |
| | Summit X670-G2, X450-G2, and X770 | 64 |
| | Summit X670, X480, X460, X460-G2, X440, E4G-200, E4G-400 | 32 |
| | Summit X430 | 4 |
| EAPsv1 protected VLANs —maximum number of protected VLANs. | BlackDiamond 8000 series, X8 series Summit series, E4G-200, E4G-400 | 2,000 1,000 |
| EAPsv2 protected VLANs —maximum number of protected VLANs. | BlackDiamond 8000 series, X8 series All Summits (except X430, X440), E4G-200, E4G-400 | 2,000 500 |
| ELSM (vlan-ports) —maximum number of VLAN ports. | BlackDiamond 8000 series, X8 series All Summits, E4G-200, E4G-400 | 5,000 |
| ERPS domains —maximum number of ERPS domains without CFM configured. | BlackDiamond 8800 series, X8 series | 32 |
| | Summit series (except X430), E4G-200, E4G-400 | 32 |
| | Summit X430 | 4 |

Table 5: Supported Limits (continued)

| Metric | Product | Limit |
|--|---|------------|
| ERPS domains—maximum number of ERPS domains with CFM configured. | BlackDiamond 8800 series, X8 series | 16 |
| | E4G-200, E4G-400 | 32 |
| | Summit X460, X460-G2 | 32 |
| | Summit X430 | 4 |
| | Summit X440, X770, X670, X670-G2, X480, X450-G2 | 16 |
| ERPSv1 protected VLANs—maximum number of protected VLANs. | BlackDiamond 8800 series, X8 series | 2,000 |
| | All Summits, E4G-200, E4G-400 | 1,000 |
| ERPSv2 protected VLANs—maximum number of protected VLANs. | BlackDiamond 8800 series, X8 series | 2,000 |
| | All Summits (except X430), E4G-200, E4G-400 | 500 |
| ESRP groups—maximum number of ESRP groups. | All platforms | 7 |
| ESRP domains—maximum number of ESRP domains. | All platforms | 64 |
| ESRP VLANs—maximum number of ESRP VLANs. | BlackDiamond 8800 | 1,000 |
| | BlackDiamond X8 | 2,048 |
| | All Summits | 1,000 |
| | E4G-200, E4G-400 | 1,000 |
| ESRP (maximum ping tracks)—maximum number of ping tracks per VLAN. | All platforms (except Summit X430) | 8 |
| ESRP (IP route tracks)—maximum IP route tracks per VLAN. | All platforms (except Summit X430) | 8 |
| ESRP (VLAN tracks)—maximum number of VLAN tracks per VLAN. | All platforms (except Summit X430) | 1 |
| Forwarding rate—maximum L3 software forwarding rate. | BlackDiamond 8000 series | 10,000 pps |
| | BlackDiamond X8 series | 20,000 pps |
| | Summit X770 | 11,000 pps |
| | Summit X670-G2 | 21,000 pps |
| | Summit X670 | 14,829 pps |
| | Summit X480 | 14,509 pps |
| | Summit X460-G2 | 25,000 pps |
| | Summit X460 | 5,222 pps |
| | Summit X450-G2 | 24,000 pps |
| | Summit X440 | 5,418 pps |
| | E4G-200 | 8,718 pps |
| | E4G-400 | 5,536 pps |

Table 5: Supported Limits (continued)

| Metric | Product | Limit |
|--|---|----------------------------------|
| FDB (unicast blackhole entries)—maximum number of unicast blackhole FDB entries. | BlackDiamond 8900 series | 32,000 |
| | 8900 c-series | 524,288 (up to) ^b |
| | 8900 xl-series | 128,000 |
| | 8900-40G6X-xm | |
| | BlackDiamond 8000 e-series | 8,000 |
| | BlackDiamond 8800 c-series | 32,000 |
| | BlackDiamond X8 a-series modules | 128,000 |
| | BlackDiamond X8-100G4X modules. | 384,000 |
| | BlackDiamond X8 xl-series module | 384,000 ^d |
| | E4G-200, E4G-400 | 32,000 |
| | Summit X440, X430 | 16,000 |
| | Summit X480 | 524,288 (up to) ^b |
| | Summit X460 | 32,000 |
| | Summit X460-G2 | 49,152 ^e |
| | Summit X670 VIM4-40G4x, X480 VIM3-40G4X | 128,000 |
| Summit X770, X670-G2 | 294,912 | |
| Summit X670, X670v-48t | 130,000 ^e | |
| Summit X450-G2 | 34,000 | |
| FDB (multicast blackhole entries)—maximum number of multicast blackhole FDB entries. | BlackDiamond 8000 series, X8 series | 1,024 |
| | Summit X480, X460-G2, X460, X440, X430, X450-G2 | 1,024 |
| | Summit X770, X670, X670-G2, X670v-48t, X480 VIM3-40G4X | 4,096 |
| | E4G-200, E4G-400 | 1,024 |
| FDB (maximum L2 entries)—maximum number of MAC addresses. | BlackDiamond 8000 c-series | 32,768 ^f |
| | BlackDiamond 8000 e-series | 8,192 ^f |
| | BlackDiamond 8000 (system), except 8900 xl-series | 128,000 ^f |
| | BlackDiamond 8900 xl-series | 524,488 (up to) ^b |
| | BlackDiamond X8 a-series modules | 128,000 ^f |
| | BlackDiamond X8-100G4X modules | 384,000 ^f |
| | BlackDiamond X8 xl-series | 1,048,576 (up to) ^{b,g} |
| | E4G-200, E4G-400 | 32,000 ^f |
| | Summit X440, X430 | 16,000 ^f |
| | Summit X480 | 524,488 (up to) ^{b,f} |
| | Summit X480 (40G4X) | 128,000 ^{b,f} |
| | Summit X460 | 32,000 ^f |
| | Summit X670-G2 | 294,912 ^f |
| | Summit X460-G2 | 98,300 ^f |
| | Summit X670 | 128,000 ^{e,f} |
| Summit X770 | 294,912 ^f | |
| Summit X450-G2 | 68,000 | |
| FDB (Maximum L2 entries)—maximum number of multicast FDB entries. | BlackDiamond X8, 8800 | 1,024 |
| | Summit X770, X670, X670-G2 | 4,096 |
| | Summit X480, X460, X460-G2, X430, X440, X450-G2 | 1,024 |
| | E4G-200, E4G-400 | 1,024 |
| FIP Snooping VLANs | BlackDiamond X8 BlackDiamond 8800 (8900-40G6X-c only) Summit X670 | 768 |

Table 5: Supported Limits (continued)

| Metric | Product | Limit |
|--|---|------------|
| FIP Snooping Virtual Links (FPMA mode) per port group | BlackDiamond X8 BlackDiamond 8800 (8900-40G6X-c only) Summit X670 | 1,908 |
| FIP Snooping FCFs (with perimeter port) per port group | BlackDiamond X8 BlackDiamond 8800 (8900-40G6X-c only) | 238 |
| FIP Snooping FCFs (with Enode-to-FCF port) | BlackDiamond X8 BlackDiamond 8800 (8900-40G6X-c only) Summit X670 | 212 |
| Identity management— maximum number of Blacklist entries. | All platforms, except Summit X430 Summit X430 | 512 N/A |
| Identity management— maximum number of Whitelist entries. | All platforms, except Summit X430 Summit X430 | 512 N/A |
| Identity management— maximum number of roles that can be created. | All platforms, except Summit X430 Summit X430 | 64 N/A |
| Identity management— maximum role hierarchy depth allowed. | All platforms, except Summit X430 Summit X430 | 5 N/A |
| Identity management— maximum number of attribute value pairs in a role match criteria. | All platforms, except Summit X430 Summit X430 | 16 N/A |
| Identity management— maximum of child roles for a role. | All platforms, except Summit X430 Summit X430 | 8 N/A |
| Identity management— maximum number of policies/dynamic ACLs that can be configured per role. | All platforms, except Summit X430 Summit X430 | 8 N/A |
| Identity management— maximum number of LDAP servers that can be configured. | All platforms, except Summit X430 Summit X430 | 8 N/A |
| Identity management— maximum number of Kerberos servers that can be configured. | All platforms, except Summit X430 Summit X430 | 20 N/A |
| Identity management— maximum database memory-size. | All platforms, except Summit X430 Summit X430 | 512 N/A |

Table 5: Supported Limits (continued)

| Metric | Product | Limit |
|--|--|--|
| Identity management —recommended number of identities per switch. Note: Number of identities per switch is for a default identity management database size (512 Kbytes) across all platforms. | All platforms, except Summit X430 Summit X430 | 100 N/A |
| Identity management —recommended number of ACL entries per identity. Note: Number of ACLs per identity based on system ACL limitation. | All platforms, except Summit X430 Summit X430 | 20 N/A |
| Identity management —maximum number of dynamic ACL entries configured as an individual dynamic rule, or as an ACL entry in a policy file. | All platforms, except Summit X430 Summit X430 | 500 N/A |
| IGMP snooping per VLAN filters —maximum number of VLANs supported in per-VLAN IGMP snooping mode. | BlackDiamond 8800 c-series BlackDiamond 8000 e-series BlackDiamond 8900 c-series BlackDiamond 8900 xl-series BlackDiamond 8900-40G6X-xm BlackDiamond X8 a-series modules BlackDiamond X8 b-series modules E4G-200, E4G-400 Summit X440 Summit X460, X670, X440 Summit X460-G2 Summit X450-G2 Summit X480 Summit X770, X670-G2 | 2,000 448 1,000 4,000 1,000 1,000 4,000 1,000 448 1,000 1,500 2,048 4,000 2,000 |
| IGMPv1/v2 SSM-map entries —maximum number of IGMPv1/v2 SSM mapping entries. | All platforms | 500 |
| IGMPv1/v2 SSM-MAP entries —maximum number of sources per group in IGMPv1/v2 SSM mapping entries. | All platforms | 50 |
| IGMPv2 subscriber —maximum number of IGMPv2 subscribers per port. ⁿ | BlackDiamond 8800 c-series, 8900 c-series, X8 series Summit X430, X460, E4G-200, E4G-400, X440 Summit X480, X670, X670v-48t Summit X770, X670-G2, X460-G2, X450-G2 | 2,000 1,000 2,000 4,000 |

Table 5: Supported Limits (continued)

| Metric | Product | Limit |
|---|---|------------------------------|
| IGMPv2 subscriber—maximum number of IGMPv2 subscribers per switch. ⁿ | BlackDiamond 8800 c-series, 8900 c-series, X8 series | 20,000 |
| | Summit X430, X440, E4G-200 | 10,000 |
| | Summit X770, X670-G2 | 30,000 |
| | Summit X460, X460-G2, X480, X670, E4G-400, X670v-48t, X450-G2 | 20,000 |
| IGMPv3 maximum source per group—maximum number of source addresses per group. | All platforms | 250 |
| IGMPv3 subscriber—maximum number of IGMPv3 subscribers per port. ⁿ | BlackDiamond 8800 e-series | 1,000 |
| | BlackDiamond 8800 c-series | 2,000 |
| | BlackDiamond 8900 series | 5,000 |
| | BlackDiamond X8 series | 3,000 |
| | Summit X480, X670, X670v-48t, E4G-200, X440 | 1,000 |
| | Summit X770, X670-G2, X460-G2, X450-G2 | 4,000 |
| | Summit X460, E4G-400 | 2,000 |
| IGMPv3 subscriber—maximum number of IGMPv3 subscribers per switch. ⁿ | BlackDiamond 8800 e-series | 10,000 |
| | BlackDiamond 8800 c-series | 20,000 |
| | BlackDiamond 8900 series | 30,000 |
| | BlackDiamond X8 series | 20,000 |
| | Summit X670, X670v-48t, X480, E4G-200, X440 | 10,000 |
| | Summit X460, X460-G2, E4G-400, X450-G2 | 20,000 |
| | Summit X770, X670-G2 | 30,000 |
| IP ARP entries in software—maximum number of IP ARP entries in software. Note: May be limited by hardware capacity of FDB (maximum L2 entries). | BlackDiamond X8-100G4X modules | 229,374 (up to) ^h |
| | Summit X670-G2, X770 | 131,072 (up to) ^h |
| | Summit X670, X480, X460, X440, X430 | 20,480 ^h |
| | Summit X460-G2 | 57,344 (up to) ^h |
| | Summit X450-G2 | 47,000 (up to) ^h |
| | E4G-200, E4G-400 | 20,480 |
| IP ARP entries in software with distributed mode on—maximum number of IP ARP entries in software with distributed mode on. | BlackDiamond 8000 series with 8900-MSM128, MSM-48c, or MSM-96 and only 8900 xl-series I/O modules | 260,000 |
| | BlackDiamond 8000 series with any I/O modules that are not 8900 xl-series | 100,000 |
| | BlackDiamond X8 series | 172,000 |
| | All other platforms | N/A |
| IPv4 ARP entries in hardware with distributed mode on—maximum number of IP ARP entries in hardware with distributed mode on | Per BlackDiamond 8900-10G8X-xl, up to 260,000 per system | 32,500 ^b |
| | Per BlackDiamond 8900-G48X-xl or 8900-G48T-xl, up to 130,000 per system | 16,250 ^b |
| | Per BlackDiamond 8000 c-series, up to 18,000 per system | 8,000 |
| | Per BlackDiamond 8900-40G6X-xm, up to 22,000 per system | 8,000 |
| | Per BlackDiamond X8 a-series, up to 28,000 per system | 12,000 |
| | Per BlackDiamond X8 xl-series, up to 172,000 per system | 172,000 |
| All other platforms | N/A | |

Table 5: Supported Limits (continued)

| Metric | Product | Limit |
|--|-------------------------------------|--------------------------------|
| IPv4 ARP entries in hardware with minimum LPM routes—maximum recommended number of IPv4 ARP entries in hardware, with minimum LPM routes present. For BlackDiamond 8800, BlackDiamond X8, E4G, and Summit series switches, assumes number of IP route reserved entries is 100 or less. | BlackDiamond 8800 c-, xm-series | 8,000 |
| | BlackDiamond 8000 e-series | 1,000 ⁱ |
| | BlackDiamond 8900 xl-series | 16,000 |
| | BlackDiamond X8 a-series | 16,000 |
| | BlackDiamond X8-100G4X modules | 182,000 (up to) ^{hm} |
| | BlackDiamond X8 xl-series | 294,000 (up to) ⁱ |
| | E4G-200 | 8,000 |
| | E4G-400 | 16,000 |
| | Summit X440 | 412 |
| | Summit X670, X480 (40G4X) | 8,000 |
| | Summit X460, X480 | 16,000 |
| | Summit X460-G2 | 50,000 (up to) ^h |
| Summit X770, X670-G2 | 108,000 (up to) ^h | |
| Summit X450-G2 | 39,000 (up to) ^h | |
| IPv4 ARP entries in hardware with maximum LPM routes—maximum recommended number of IPv4 ARP entries in hardware, with maximum LPM routes present. For BlackDiamond 8800, BlackDiamond X8, E4G, and Summit series, assumes number of IP route reserved entries is “maximum.” | BlackDiamond 8800 c-, xm-series | 6,000 ⁱ |
| | BlackDiamond 8000 e-series | 500 ⁱ |
| | BlackDiamond 8900 xl-series | 12,000 ⁱ |
| | BlackDiamond X8 a-series | 12,000 ⁱ |
| | BlackDiamond X8-100G4X modules | 172,000 (up to) ^{hj} |
| | BlackDiamond X8 xl-series | 290,000 (up to) ⁱ |
| | E4G-200 | 6,000 ⁱ |
| | E4G-400 | 12,000 ⁱ |
| | Summit X440 | 380 |
| | Summit X460, X480 | 12,000 ⁱ |
| | Summit X670, X480 VIM3-40G4X | 6,000 ⁱ |
| | Summit X770, X670-G2 | 98,000 (up to) ^h |
| Summit X460-G2 | 43,000 (up to) ^h | |
| Summit X450-G2 | 29,000 (up to) ^h | |
| IP flow information export (IPFIX)—number of simultaneous flows. | BlackDiamond 8900 xl-series modules | 4,096 ingress, 4,096 egress |
| | BlackDiamond 8900 c-series modules | 4,096 ingress, 4,096 egress |
| | BlackDiamond X8 b-series modules | 2,048 ingress, 2,048 egress |
| | Summit X460-24t/x/p, X460-G2 | 2,048 ingress, 2,048 egress |
| | Summit X480, X460-48t/x/p | 4,096 ingress, 4,096 egress |
| | E4G-400 | 2,048 ingress, 2,048 egress |

Table 5: Supported Limits (continued)

| Metric | Product | Limit |
|---|--|---------------------------------|
| IPv4 remote hosts in hardware with zero LPM routes —maximum recommended number of IPv4 remote hosts (hosts reachable through a gateway) in hardware when LPM routing is not used. For BlackDiamond 8800, BlackDiamond X8, E4G, and Summit series, assumes number of IP route reserved entries is 0, and number of IPv4 ARP entries present is 100 or less. | BlackDiamond 8800 c-series | 18,000 ⁱ |
| | BlackDiamond 8000 e-series | 1,000 ⁱ |
| | BlackDiamond 8900 xl-series | 40,000 ^b |
| | BlackDiamond 8900-40G6X-xm | 22,000 ⁱ |
| | BlackDiamond X8 a-series | 28,000 ⁱ |
| | BlackDiamond X8-100G4X and X8 xl-series | 311,000 (up to) ^h |
| | E4G-200 | 18,000 ⁱ |
| | E4G-400 | 20,000 ⁱ |
| | Summit X440 | 448 |
| | Summit X460 | 20,000 ⁱ |
| | Summit X460-G2 | 73,000 ^h |
| | Summit X480 | 40,000 ^b |
| | Summit X670, X480 VIM3-40G4X | 22,000 ⁱ |
| Summit X770, X670-G2 | 176,000 (up to) ^h | |
| Summit X450-G2 | 61,000 (up to) ^h | |
| IPv4 routes —maximum number of IPv4 routes in software (combination of unicast and multicast routes). | BlackDiamond 8900 xl-series with 8900-MSM128, MSM-48c, or MSM-96 | 524,256 (up to) ^b |
| | All other BlackDiamond 8000 series hardware | 25,000 |
| | BlackDiamond X8 series | 1,048,544 (up to) ⁱ |
| | BlackDiamond X8 with BDX X8 xl-series | 256 |
| | Summit X440 | 25,000 |
| | Summit X460, X670, X770, X670-G2, X460-G2, X450-G2 | 524,256 (up to) ^b |
| | Summit X480 | 25,000 |
| E4G-200, E4G-400 | | |
| IPv4 routes (LPM entries in hardware) — number of IPv4 routes in hardware. | BlackDiamond 8800 c-series | 12,000 |
| | BlackDiamond 8000 e-series | 480 |
| | BlackDiamond 8900 xl-series | 524,256 (up to) ^b |
| | BlackDiamond 8900-40G6X-xm | 16,000 ^e |
| | BlackDiamond X8 series | 16,000 ^e |
| | BlackDiamond BDX X8 xl-series | 1,048,544 (up to) |
| | E4G-200, E4G-400 | 12,000 |
| | Summit X440 | 32 |
| | Summit X460, X460-G2 | 12,000 |
| | Summit X480 | 524,256 (up to) ^{b, o} |
| | Summit X480 VIM3-40G4X | 16,000 ^o |
| Summit X670 | 12,000 | |
| Summit X770, X670-G2, X450-G2 | 16,000 | |
| IPv6 addresses on an interface —maximum number of IPv6 addresses on an interface. | All platforms | 255 |
| IPv6 addresses on a switch —maximum number of IPv6 addresses on a switch. | BlackDiamond 8000 series | 512 |
| | BlackDiamond X8 series | 2,048 |
| | E4G-200, E4G-400 | 512 |
| | Summit X440 | 254 |
| | Summit X460, X480 | 512 |
| | Summit X770, X670, X670-G2, X460-G2, X450-G2 | 2,048 |

Table 5: Supported Limits (continued)

| Metric | Product | Limit |
|---|--|------------------------------|
| IPv6 host entries in hardware—maximum number of IPv6 neighbor entries in hardware. | BlackDiamond 8800 c-, xm-series | 3,000 ⁱ |
| | BlackDiamond 8000 e-series | 250 ⁱ |
| | BlackDiamond 8900-10G24X-c modules | 2,000 ⁱ |
| | BlackDiamond 8900-G96T-c modules | 4,000 ⁱ |
| | BlackDiamond 8900 xl-series | 8,192 (up to) ^{bi} |
| | BlackDiamond X8 a-series | 3,000 ⁱ |
| | BlackDiamond X8-100G4X | 49,000 ^{ih} |
| | BlackDiamond X8 xl-series | 49,000 ^{il} |
| | E4G-200 | 2,000 ⁱ |
| | E4G-400 | 3,000 ⁱ |
| | Summit X440 | 192 ⁱ |
| | Summit X460, X670, X480 VIM3-40G4X | 3,000 ⁱ |
| | Summit X770, X670-G2 | 36,750 ⁱ |
| | Summit X480, X670v-48t | 6,000 ⁱ |
| | Summit X460-G2 | 22,000 ⁱ |
| Summit X450-G2 | 12,000 ⁱ | |
| IPv6 routes (LPM entries in hardware)—maximum number of IPv6 routes in hardware. | BlackDiamond 8800 c-series | 6,000 |
| | BlackDiamond 8000 e-series | 240 |
| | BlackDiamond 8900 xm-series | 8,000 |
| | BlackDiamond 8900 xl-series | 245,760 (up to) ^b |
| | BlackDiamond X8 series | 8,000 |
| | BlackDiamond X8 xl-series | 524,288 (up to) ^l |
| | E4G-200, E4G-400 | 6,000 |
| | Summit X440 | 16 |
| | Summit X460, X460-G2 | 6,000 |
| | Summit X480 | 245,760 (up to) ^b |
| Summit X670, X480 (VIM3-40G4X), X670-G2, X770, X450-G2 | 8,000 | |
| IPv6 routes with a mask greater than 64 bits in hardware—maximum number of such IPv6 LPM routes in hardware. | BlackDiamond 8000 c-, e-, xm-series | 256 |
| | BlackDiamond 8000 xl-series | 245,760 (up to) ^k |
| | BlackDiamond X8 series | 256 |
| | BlackDiamond X8 xl-series | 524,288 (up to) ^l |
| | E4G-200, E4G-400 | 256 |
| | Summit X480 | 245,760 (up to) ^k |
| Summit X440, X460, X460-G2, X670, X670-G2, X770, X480 (VIM3-40G4X), X450-G2 | 256 | |
| IPv6 route sharing in hardware—route mask lengths for which ECMP is supported in hardware. Note: * >64 single path only | Summit X460, X480, X670, X670V-48t | 0-128 |
| | E4G-200, E4G-400 | 0-128 |
| | BlackDiamond 8800 (all I/O modules, except G48Te2) | 0-128 |
| | Summit X460-G2, X670-G2, X770 | 0-64 * |
| | BlackDiamond X8 a-series | 0-128 |
| | BlackDiamond X8-100G4X modules | 0-64 * |
| | BlackDiamond X8 xl-series, Summit X450-G2 | 0-128 ^l |
| | Summit X440, X430 | N/A |
| | BlackDiamond 8800 G48Te2 | N/A |

Table 5: Supported Limits (continued)

| Metric | Product | Limit |
|---|---|--|
| IPv6 routes in software— maximum number of IPv6 routes in software. | BlackDiamond 8900 xl-series with 8900-MSM128, MSM-48c, or MSM-96 | 245,760 (up to) ^k 25,000 |
| | All other BlackDiamond 8000 series hardware | 25,000 |
| | BlackDiamond X8 series | 524,288 (up to) ^l |
| | BlackDiamond X8 with xl-series | 25,000 |
| | Summit X460, X460-G2, X670, X670-G2, X770, X450-G2, E4G-200, E4G-400 | 245,760 (up to) ^k |
| | Summit X480 Summit X440 | 256 |
| IP router interfaces—maximum number of VLANs performing IPv4 and/or IPv6 routing. Excludes sub-VLANs. | Summit X460-G2, X670, X770, X670-G2, X450-G2, and BlackDiamond X8 | 2,048 |
| | BlackDiamond 8800 | 512 |
| | Summit X440 | 254 |
| | Summit X480, X460 | 512 |
| | E4G-200, E4G-400 | 512 |
| IP multicast static routes— maximum number of permanent multicast IP routes. | All platforms (except Summit X430, X440) | 1,024 |
| | Summit X430, X440 | 32 |
| IP unicast static routes— maximum number of permanent IP unicast routes. | All platforms (except Summit X430, X440) | 1,024 |
| | Summit X430, X440 | 32 |
| IP route sharing (maximum gateways)—Configurable maximum number of gateways used by equal cost multipath OSPF, BGP, IS-IS, static routes, or L2VPNs. Routing protocol OSPF is limited to 16 ECMP gateways per destination. Routing protocols BGP and IS- IS are limited to 8 ECMP gateways per destination. Static routes are limited to 64 next-hops. L2VPNs are limited to 16 LSPs per pseudowire on platforms that support 32 gateways, and 64 LSPs per pseudowire on platforms that support 64 gateways. | All platforms, except Summit X430, X440, X670, and BlackDiamond X8 | 2, 4, 8, 16, 32 |
| | Summit X670, BlackDiamond X8 | 2, 4, 8, 16, or 32, |
| | Summit X430, X440 | or 64 |
| | BlackDiamond 8800 G48Te2 (for IPv6) | N/A N/A |

Table 5: Supported Limits (continued)

| Metric | Product | Limit |
|---|---|--------------------------------|
| IP route sharing (total destinations)—maximum number of unique destinations used by multipath OSPF, OSPFv3, BGP, IS-IS, or static routes. | BlackDiamond 8800 c-series | 12,256 |
| | BlackDiamond 8000 e-series | 480 |
| | BlackDiamond 8900 xl-series | 524,256 (up to) ^b |
| | BlackDiamond 8900-40G6X-xm | 16,352 |
| | BlackDiamond X8 | 16,352 |
| | BlackDiamond X8 xl-series | 1,048,544 (up to) ⁱ |
| | E4G-200, E4G-400 | 12,256 |
| | Summit X480 | 524,256 (up to) ^b |
| | Summit X670, X670-G2, X770, X450-G2, X480 (VIM3-40G4X) | 16,352 |
| | Summit X460-G2, X460 | 12,256 |
| | <p>Note:</p> <p>For platforms with limit of 524,256 or higher, the total number of "destination+gateway" pairs is limited to 2,097,024. For example, if the number of unique destinations is 524,256, only 2 gateways per destination is supported.</p> <p>For other platforms, each limit is based on up to 8 gateways per destination for BGP and IS-IS routing protocols, up to 16 gateways per destination for OSPF, or up to 32 gateways per destination for static routes.</p> | |

Table 5: Supported Limits (continued)

| Metric | Product | Limit |
|---|--|--|
| IP route sharing (total combinations of gateway sets) —maximum number of combinations of sets of adjacent gateways used by multipath OSPF, BGP, IS-IS, or static routes. | BlackDiamond 8800 c-, xl-, and xm-series | |
| | default maximum gateways of 4 | 510 |
| | if maximum gateways is 2 | 1,022 |
| | if maximum gateways is 8 | 254 |
| | if maximum gateways is 16 | 126 |
| | if maximum gateways is 32 | 62 |
| | BlackDiamond 8000 e-series | |
| | default maximum gateways of 4 | 30 |
| | if maximum gateways is 2 | 62 |
| | if maximum gateways is 8 | 14 |
| | if maximum gateways is 16 | 6 |
| | if maximum gateways is 32 | 2 |
| BlackDiamond X8 series, Summit X670 | | |
| default maximum gateways of 4 | 510 | |
| if maximum gateways is 2 | 1,022 | |
| if maximum gateways is 8 | 254 | |
| if maximum gateways is 16 | 126 | |
| if maximum gateways is 32 | 62 | |
| if maximum gateway is 64 | 30 | |
| Summit X460, X460-G2, X450-G2, X480, X670, X670-G2, X770, E4G-200, E4G-400 | | |
| default maximum gateways of 4 | 510 | |
| if maximum gateways is 2 | 1,022 | |
| if maximum gateways is 8 | 254 | |
| if maximum gateways is 16 | 126 | |
| if maximum gateways is 32 | 62 | |
| IP multinetting (secondary IP addresses) —maximum number of secondary IP addresses per VLAN. | BlackDiamond 8800, BlackDiamond X8 All Summits, except X440, X430 Summit X440 | 64 255 32 |
| IS-IS adjacencies —maximum number of supported IS-IS adjacencies. | BlackDiamond 8000 series, BlackDiamond X8 series BlackDiamond 8900 xl-series Summit X440, X460, X460-G2, X480, X670, X670-G2, X770 Summit X450-G2 E4G-200 E4G-400 | 128 255 128 N/A 256 128 |
| IS-IS ECMP —maximum number of equal cost multipath for IS-IS. | All platforms, except Summit X440, X430 BlackDiamond 8800 G48Te2 (for IPv6) | 2, 4, or 8 N/A |
| IS-IS interfaces —maximum number of interfaces that can support IS-IS. | All platforms, except Summit X440, x430 | 255 |

Table 5: Supported Limits (continued)

| Metric | Product | Limit |
|--|---|------------------|
| IS-IS routers in an area—recommended maximum number of IS-IS routers in an area. | Summit X480 | 128 |
| | All other platforms, except Summit X440, X430 | 256 |
| IS-IS route origination—recommended maximum number of routes that can be originated by an IS-IS node. | BlackDiamond 8000 series, BlackDiamond X8 series | 20,000 |
| | BlackDiamond X8 xl-series, 8900 xl-series | 30,000 |
| | E4G-400 | 25,000 |
| | E4G-200 | 20,000 |
| | Summit X450-G2, X460, X460-G2, X670, X670-G2, X770, X480 | 20,000 |
| IS-IS IPv4 L1 routes in an L1 router—recommended maximum number of IS-IS Level 1 routes in a Level 1 IS-IS router. | BlackDiamond 8000 series, BlackDiamond X8 series | 25,000 |
| | BlackDiamond X8 xl-series, 8900 xl-series | 120,000 |
| | Summit X480 | 50,000 |
| | Summit X450-G2, X460, X460-G2, X670, X670-G2, X770 | 25,000 |
| | E4G-200, E4G-400 | 25,000 |
| IS-IS IPv4 L2 routes—recommended maximum number of IS-IS Level 2 routes. | BlackDiamond 8000 series | 20,000 |
| | BlackDiamond X8 series | 25,000 |
| | BlackDiamond X8 xl-series, 8900 xl-series | 120,000 |
| | Summit X480 | 50,000 |
| | Summit X450-G2, X460, X460-G2, X670, X670-G2, X770 E4G-200, E4G-400 | 25,000 25,000 |
| IS-IS IPv4 L1 routes in an L1/L2 router—recommended maximum number of IS-IS Level 1 routes in an L1/L2 IS-IS router. | BlackDiamond 8000 series, X8 series, 8900 xl-series E4G-200, E4G-400 Summit X450-G2, X460, X460-G2, X480, X670, X670-G2, X770 | 20,000 |
| IS-IS IPv6 L1 routes in an L1 router—recommended maximum number of IS-IS Level 1 routes in a Level 1 IS-IS router. | BlackDiamond 8000 series, X8 series | 10,000 |
| | BlackDiamond X8 xl-series, 8900 xl-series | 40,000 |
| | Summit X480 | 25,000 |
| | Summit X450-G2, X460, X460-G2, X670, X670-G2, X770, E4G-400 | 10,000 |
| IS-IS IPv6 L2 routes—recommended maximum number of IS-IS Level 2 routes. | BlackDiamond 8000 series, X8 series | 10,000 |
| | BlackDiamond X8 xl-series, 8900 xl-series | 40,000 |
| | Summit X480 | 15,000 |
| | Summit X450-G2, X460, X460-G2, X670, X670-G2, X770 E4G-200, E4G-400 | 10,000 10,000 |
| IS-IS IPv6 L1 routes in an L1/L2 router—recommended maximum number of IS-IS Level 1 routes in a L1/L2 router. | BlackDiamond 8000 series, X8 series | 10,000 |
| | BlackDiamond X8 xl-series, 8900 xl-series | 15,000 |
| | Summit X480 | 15,000 |
| | Summit X450-G2, X460, X460-G2, X670, X670-G2, X770, E4G-400 | 10,000 |
| IS-IS IPv4/IPv6 L1 routes in an L1 router—recommended maximum number of IS-IS Level 1 routes in a Level 1 IS-IS router. The numbers documented are based on 50% IPv4 routes and 50% IPv6 routes. | BlackDiamond 8000 series, X8 series | 20,000 |
| | BlackDiamond X8 xl-series, 8900 xl-series | 60,000 |
| | Summit X480 | 40,000 |
| | Summit X450-G2, X460, X460-G2, X670, X670-G2, X770 | 20,000 |
| | E4G-200, E4G-400 | 20,000 |

Table 5: Supported Limits (continued)

| Metric | Product | Limit |
|---|---|------------------------|
| IS-IS IPv4/IPv6 L2 routes in an L2 router—recommended maximum number of IS-IS Level 2 routes in a Level 2 IS-IS router. The numbers documented are based on 50% IPv4 routes and 50% IPv6 routes. | BlackDiamond 8000 series, X8 series | 20,000 |
| | BlackDiamond X8 xl-series, 8900 xl-series | 60,000 |
| | Summit X480 | 40,000 |
| | Summit X450-G2, X460,X460-G2, X670, X670-G2, X770 | 20,000 |
| | E4G-200, E4G-400 | 20,000 |
| IS-IS IPv4/IPv6 L1 routes in an L1/L2 router—recommended maximum number of IS-IS Level 1 routes in a Level 1/ Level2 IS-IS router. The numbers documented are based on 50% IPv4 routes and 50% IPv6 routes. | BlackDiamond 8000 series | 20,000 |
| | BlackDiamond X8 series | |
| | BlackDiamond 8900 xl-series | |
| | Summit X450-G2, X460, X460-G2, X480, X670, X670-G2, X770 | |
| | E4G-200, E4G-400 | |
| Jumbo frames—maximum size supported for jumbo frames, including the CRC. | All platforms | 9,216 |
| L2 VPN: VCCV (pseudowire Virtual Circuit Connectivity Verification) VPNs per switch—maximum number of VCCV enabled VPLS VPNs. | All platforms, except Summit X440, X430, and X450-G2 | 16 |
| L2 VPN: VPLS MAC addresses —maximum number of MAC addresses learned by a switch. | BlackDiamond 8900 xl-series | 512,000 |
| | BlackDiamond 8900-40G6X-xm | 128,000 |
| | BlackDiamond X8 a-series modules | 128,000 |
| | BlackDiamond X8-100G4X modules | 384,000 |
| | BlackDiamond X8 xl-series | 1,048,576 ⁹ |
| | E4G-200, E4G-400 | 32,000 |
| | Summit X460 | 32,000 |
| | Summit X480 | 512,000 |
| | Summit X670, Summit X670V-48t, Summit X770 | 128,000 |
| | Summit X480 (40G VIM) | 121,000 |
| | Summit X670-G2 | 140,000 |
| | Summit X460-G2 | 55,000 |
| Summit X450-G2 | N/A | |
| L2 VPN: VPLS VPNs—maximum number of VPLS virtual private networks per switch. | BlackDiamond 8900 xl-series BlackDiamond 8900-40G6x-xm BlackDiamond X8 series E4G-200, E4G-400 Summit X460, X460-G2, X480, X670, X670V-48t, X480 (40G VIM), X770, X670-G2 | 1,023 |
| L2 VPN: VPLS peers—maximum number of VPLS peers per VPLS instance. | BlackDiamond 8900 xl-series, 8900-40G6x-xm, X8 series | 64 |
| | Summit X770, X670-G2, X670v-48t, X480, X460-G2 | 64 |
| | Summit X670, X460 | 32 |
| | E4G-200, E4G-400 | 32 |

Table 5: Supported Limits (continued)

| Metric | Product | Limit |
|---|---|--------------|
| L2 VPN: LDP pseudowires — maximum number of pseudowires per switch. | BlackDiamond 8900 xl-series, X8 series | 7,000 |
| | BlackDiamond 8900-40G6X-xm | 3,000 |
| | E4G-200, E4G-400 | 1,000 |
| | Summit X770 | 7,800 |
| | Summit X670-G2, X670v-48t, X480 | 7,000 |
| | Summit X670 | 3,000 |
| | Summit X460-G2 | 7,116 |
| | Summit X460 Summit X450-G2 | 1,000 N/A |
| L2 VPN: static pseudowires — maximum number of static pseudowires per switch. | BlackDiamond 8900 xl-series, X8 series | 7,116 |
| | BlackDiamond 8900-40G6X-xm | 3,020 |
| | Summit X460, X480, X670V-48t | 7,116 |
| | Summit X770 | 15,308 |
| | Summit X480-40G, Summit X670 | 3,020 |
| | Summit X670-G2, X460-G2 | 7,000 |
| | E4G-200 | 2,764 |
| | E4G-400 Summit X450-G2 | 6,860 N/A |
| L2 VPN: Virtual Private Wire Service (VPWS) VPNs — maximum number of virtual private networks per switch. | Summit X460 | 1,000 |
| | Summit X480, X770 | 4,000 |
| | Summit X480-40G VIM, X670 | 2,047 |
| | Summit X670V-48t | 4,000 |
| | BlackDiamond 8900 xl-series | 4,000 |
| | BlackDiamond 8900-40G6X-xm | 2,047 |
| | BlackDiamond X8 series | 4,000 |
| | Summit X670-G2 | 4,090 |
| | Summit X460-G2 | 1,023 |
| | E4G-200, E4G-400 Summit X450-G2 | 1,000 N/A |
| Layer-2 IPMC forwarding caches —(IGMP/MLD/PIM snooping) in mac-vlan mode. Note: <ul style="list-style-type: none"> The internal lookup table configuration used is "I2-and-I3". IPv6 and IPv4 L2 IPMC scaling is the same for this mode. Layer-2 IPMC forwarding cache limits — (IGMP/MLD/PIM snooping) in mixed-mode are the same. | BlackDiamond 8800 e-series switches | 2,000 |
| | BlackDiamond 8800 c- and xl-series switches | 8,000 |
| | BlackDiamond 8800 xm-series switches | 15,000 |
| | BlackDiamond X8 series switches | 15,000 |
| | E4G-200, E4G-400 | 8,000 |
| | Summit X480, X460 | 8,000 |
| | Summit X670, X670V | 15,000 |
| | Summit X440 | 5,000 |
| | Summit X770, X670-G2 | 73,000 |
| | Summit X460-G2 | 24,000 |
| | Summit X430 | 5,000 |
| | Summit X450-G2 | 14,000 |

Table 5: Supported Limits (continued)

| Metric | Product | Limit |
|--|---|--------|
| Layer-3 IPv4 Multicast — maximum number of <S,G,V> entries installed in the hardware (IP multicast compression enabled). Note: <ul style="list-style-type: none"> Limit value same for MVR senders , PIM Snooping entries. PIM SSM cache,IGMP senders, PIM cache. The internal lookup table configuration used is ""more I3-and-ipmc". Assumes source-group-vlan mode as look up key. Layer 3 IPMC cache limit in mixed mode also has the same value. " | BlackDiamond 8800 c-series | 6,000 |
| | BlackDiamond 8000 e-series | 500 |
| | BlackDiamond 8900 c-series | 6,000 |
| | BlackDiamond 8900 xl-series | 12,000 |
| | BlackDiamond 8900-40G6X-xm | 3,000 |
| | BlackDiamond X8 a-series | 6,000 |
| | BlackDiamond X8-100G4X and X8 xl-series | 59,000 |
| | E4G-200 | 3,000 |
| | E4G-400 | 6,000 |
| | Summit X440 | 192 |
| | Summit X480 | 12,000 |
| | Summit X460 | 6,000 |
| | Summit X670 | 3,000 |
| | Summit X770, X670-G2 | 77,500 |
| | Summit X450-G2 | 21,000 |
| Summit X460-G2 | 26,000 | |
| Layer-3 IPv6 Multicast — maximum number of <S,G,V> entries installed in the hardware (IP multicast compression enabled). Note: <ul style="list-style-type: none"> Limit value same for MLD sender per switch,PIM IPv6 cache. The internal lookup table configuration used is ""more I3-and-ipmc". Assumes source-group-vlan mode as look up key. | BlackDiamond 8800 c-series | 1,000 |
| | BlackDiamond 8800 e-series | 250 |
| | BlackDiamond 8900 c-series | 1,000 |
| | BlackDiamond 8900-40G6X-xm | 1,000 |
| | BlackDiamond 8900 xl-series | 3,000 |
| | BlackDiamond X8 a-series | 3,000 |
| | BlackDiamond X8-100G4X and X8 xl-series | 30,000 |
| | E4G-200 | 1,500 |
| | E4G-400 | 3,000 |
| | Summit X440 | 90 |
| | Summit X460, X480, X670 | 3,000 |
| | Summit X770, X670-G2 | 30,000 |
| | Summit X450-G2 | 10,000 |
| | Summit X460-G2 | 14,000 |

Table 5: Supported Limits (continued)

| Metric | Product | Limit |
|--|---|--------|
| Load sharing —maximum number of load-sharing groups. Note: The actual number of load-sharing groups that can be configured is limited by the number of physical ports present in the switch or SummitStack. | BlackDiamond 8000 series without 8900-40G6X-xm | |
| | With distributed IP ARP mode off (default) | 128 |
| | With distributed IP ARP mode on | 64 |
| | BlackDiamond 8000 series 8900-40G6X-xm using address-based custom algorithm | |
| | With distributed IP ARP mode off (default) | 128 |
| | With distributed IP ARP mode on | 64 |
| | BlackDiamond 8000 series with 8900-40G6X-xm with L2, L3 or L3_L4 algorithm configured for any group | |
| | With distributed IP ARP mode off (default) | 127 |
| With distributed IP ARP mode on | 63 | |
| SummitStack with X670 with L2, L3 or L3_L4 algorithm configured for any group | 127 | |
| All other SummitStack configurations and Summit series switches | 128 | |
| BlackDiamond X8 series using address-based custom algorithm | | |
| With distributed IP ARP mode off (default) | 384 | |
| With distributed IP ARP mode on | 384 | |
| BlackDiamond X8 series with L2, L3 or L3_L4 algorithm configured for any group | | |
| With distributed IP ARP mode off (default) | 127 | |
| With distributed IP ARP mode on | 63 | |
| Load sharing —maximum number of ports per load-sharing group. Note: *For custom algorithm ** For L2 and L3 algorithms Note: For a mix of Summit X770 and Summit X670 series switches in a stack, the limits are the Summit X670 limits. | BlackDiamond X8 series | 64 |
| | Summit X460-G2 (standalone) | 32 |
| | Summit X670 (standalone) | 32 * |
| | | 16 ** |
| | Summit X670 (stacked) | 64 * |
| | Summit X670-G2 (stacked) | 16 ** |
| | Summit X770 (standalone) | 32 |
| | Summit X670-G2 (standalone) | |
| | Summit X460-G2 (standalone) | |
| | Summit X450-G2 (standalone) | |
| Summit X770 (stacked) | 64 | |
| Summit X670-G2 (stacked) | | |
| Summit X460-G2 (stacked) | | |
| Summit X450-G2 (stacked) | | |
| All other Summit series, SummitStacks, E4G cell site routers, and BlackDiamond 8000 series switches | 8 | |
| Logged messages —maximum number of messages logged locally on the system. | All platforms | 20,000 |

Table 5: Supported Limits (continued)

| Metric | Product | Limit |
|---|--|--|
| MAC address learning rate —hardware learning rat. | E4G-200 | 22 msec |
| MAC-based security —maximum number of MAC-based security policies. | All platforms | 1,024 |
| MAC Locking —Maximum number of MAC locking stations that can be learned on a port. | All platforms | 64 (static MAC locking stations) 600 (first arrival MAC locking stations) |
| Meters —maximum number of meters supported. | All platforms | 2,048 |
| Maximum mirroring instances Note: The Summit X430 can only support one egress mirroring instance. | All platforms Note: Only two or four mirroring instance will be active at a time depending on the mirroring filter added to it. There are four hardware resource slots. Each single instance uses one such slot, while each ingress plus egress instance uses two slots. So this allows the you to use a total of four slots, while there are no more then two egress instances. The maximum possible combination for mirroring instances: 1 4 ingress 2 3 ingress + 1 egress 3 2 ingress + 2 egress 4 2 (ingress + egress) 5 1 (ingress + egress) + 2 ingress 6 1 (ingress + egress) + 1 egress + 1 ingress | 16 (including default mirroring instance) |
| Mirroring (filters) —maximum number of mirroring filters. Note: This is the number of filters across all the active mirroring instances. | BlackDiamond 8000 series BlackDiamond X8 series All Summit series E4G cell site routers | 128 |
| Mirroring, one-to-many (filters) —maximum number of one-to-many mirroring filters. Note: This is the number of filters across all the active mirroring instances | BlackDiamond 8000 series BlackDiamond X8 series All Summit series E4G cell site routers | 128 |
| Mirroring, one-to-many (monitor port) —maximum number of one-to-many monitor ports. | All platforms | 16 |

Table 5: Supported Limits (continued)

| Metric | Product | Limit |
|---|---|-----------------------------------|
| MLAG ports —maximum number of MLAG ports allowed. | BlackDiamond 8000 series BlackDiamond X8 series All Summit series (except X430) E4G cell site routers | 768 |
| MLAG peers —maximum number of MLAG peers allowed. | All platforms, except Summit X430 | 2 |
| MPLS RSVP-TE interfaces —maximum number of interfaces. | All platforms, except Summit X450-G2, X440, and X430 | 32 |
| MPLS RSVP-TE ingress LSPs —maximum number of ingress LSPs. | All platforms, except Summit X450-G2, X440, and X430 | 2,000 |
| MPLS RSVP-TE egress LSPs —maximum number of egress LSPs. | All platforms, except Summit X450-G2, X440, and X430 | 2,000 |
| MPLS RSVP-TE transit LSPs —maximum number of transit LSPs. | All platforms, except Summit X450-G2, X440, and X430 | 2,000 |
| MPLS RSVP-TE paths —maximum number of paths. | All platforms, except Summit X450-G2, X440, X430, and X670-G2 Summit X670-G2 | 1,000 2,000 |
| MPLS RSVP-TE profiles —maximum number of profiles. | All platforms, except Summit X440, X430, X670-G2, and X450-G2 Summit X670-G2 | 1,000 2,000 |
| MPLS RSVP-TE EROs —maximum number of EROs per path. | All platforms, except Summit X450-G2, X440, and X430 Summit X450-G2 | 64 N/A |
| MPLS RSVP-TE fast reroute —MPLS RSVP-TE fast reroute (FRR) switching time. | E4G-200 | 50 msec |
| MPLS LDP peers —maximum number of MPLS LDP peers per switch. | BlackDiamond 8900 xl-series, 8900-40G6x-xm BlackDiamond X8 series E4G-400, E4G-200 Summit X460, Summit X670 Summit X670-G2, X460-G2 Summit X480, Summit X480 (40G VIM), X670V-48t, X770, X670v-48t | 64 64 32 32 128 64 |
| MPLS LDP adjacencies —maximum number of MPLS LDP adjacencies per switch. | BlackDiamond 8900 xl-series BlackDiamond 8900-40G6x-xm BlackDiamond X8 series E4G-200, E4G-400 Summit X460, X480, X670, X460-G2 Summit X670V-48t, X480 (40G VIM), X770, X670-G2 | 50 64 50 50 50 64 |

Table 5: Supported Limits (continued)

| Metric | Product | Limit |
|--|---|--------|
| MPLS LDP ingress LSPs— maximum number of MPLS LSPs that can originate from a switch. | BlackDiamond 8900 xl-series | 4,000 |
| | BlackDiamond 8900-40G6X-xm | 2,048 |
| | BlackDiamond X8 series | 2,048 |
| | E4G-200 | 2,048 |
| | E4G-400 | 4,000 |
| | Summit X460, X480, | 4,000 |
| | Summit X670, X670V-48t, X480 (40G VIM), X770, X670-G2 | 2,048 |
| | Summit X460-G2 | 4,000 |
| MPLS LDP-enabled interfaces —maximum number of MPLS LDP configured interfaces per switch. | Summit X460, X670 | 32 |
| | Summit X480, X670V-48t, X770 | 64 |
| | Summit X670-G2, X460-G2 | 128 |
| | BlackDiamond 8900 xl-series | 64 |
| | BlackDiamond 8900-40G6x-xm | 64 |
| | BlackDiamond X8 series | 64 |
| | E4G-200, E4G-200 | 32 |
| MPLS LDP sessions—maximum number of MPLS LDP sessions. | BlackDiamond 8900 xl-series | 64 |
| | BlackDiamond 8900-40G6x-xm | 64 |
| | BlackDiamond X8 series | 64 |
| | Summit X770, X670v-48t, X480 | 64 |
| | Summit X670-G2, X460-G2 | 128 |
| | Summit X670, X460 | 32 |
| | E4G-200, E4G-400 | 32 |
| MPLS LDP transit LSPs— maximum number of MPLS transit LSPs per switch. | BlackDiamond 8900 xl-series | 4,000 |
| | BlackDiamond 8900-40G6X-xm | 3,000 |
| | BlackDiamond X8 series | 4,000 |
| | E4G-200 | 2,700 |
| | E4G-400 | 4,000 |
| | Summit X460, X480, X770, X670V-48t, X670-G2, X460-G2 | 4,000 |
| | Summit X670, X480 (VIM3-40G4x) | 3,000 |
| MPLS LDP egress LSPs— maximum number of MPLS egress LSPs that can terminate on a switch. | BlackDiamond 8900 xl-series | 7,000 |
| | BlackDiamond 8900-40G6X-xm | 3,000 |
| | BlackDiamond X8 series | 7,000 |
| | E4G-200 | 2,700 |
| | E4G-400 | 6,700 |
| | Summit X460, X480, X670V-48t | 7,000 |
| | Summit X670, X480 (VIM3-40G4x) | 3,000 |
| | Summit X770 | 8,000 |
| | Summit X670-G2, X460-G2 | 4,000 |
| MPLS static egress LSPs— maximum number of static egress LSPs. | BlackDiamond 8900 xl-series, BlackDiamond X8 | 7,116 |
| | BlackDiamond 8900-40G | 3,020 |
| | Summit X460, X480, X670V-48t, X460-G2 | 7,116 |
| | Summit X480 (VIM3-40G4x), X670 | 3,020 |
| | Summit X770 | 8,000 |
| | Summit X670-G2 | 15,308 |
| | E4G-200 | 2,700 |
| E4G-400 | 6,860 | |

Table 5: Supported Limits (continued)

| Metric | Product | Limit |
|---|--|--------|
| MPLS static ingress LSPs— maximum number of static ingress LSPs. | BlackDiamond 8900 xl-series | 4,000 |
| | BlackDiamond 8900-40G | 2,048 |
| | BlackDiamond X8 | 2,048 |
| | Summit X460, X480, X460-G2 | 4,000 |
| | Summit x480-40G, X670, x670V-48t, X770, X670-G2 | 2,048 |
| | E4G-200 | 2,048 |
| | E4G-400 | 4,000 |
| MPLS static transit LSPs— maximum number of static transit LSPs | BlackDiamond 8900 xl-series | 4,000 |
| | BlackDiamond 8900-40G | 3,000 |
| | BlackDiamond X8 | 4,000 |
| | Summit X460, X480, X670V-48t, X770, X670-G2, X460-G2 | 4,000 |
| | Summit X480-40G, X670 | 3,000 |
| | E4G-200 | 2,700 |
| | E4G-400 | 4,000 |
| MSDP active peers—maximum number of active MSDP peers. | BlackDiamond 8000 series, 8900 series, X8 series | 64 |
| | Summit X460, X480, X670, E4G-400, X460-G2 | 16 |
| | Summit X770, X670-G2 | 64 |
| | Summit X450-G2 (Advanced Edge License) | N/A |
| MSDP SA cache entries— maximum number of entries in SA cache. | BlackDiamond 8000 series, 8900 series, X8 series | 16,000 |
| | Summit X480, X670, E4G-400 | 8,000 |
| | Summit X670-G2, X770 | 14,000 |
| | Summit X460-G2 | 10,000 |
| | Summit X450-G2 | 8,000 |
| | Summit X460 | 6,000 |
| MSDP maximum mesh groups —maximum number of MSDP mesh groups. | BlackDiamond 8000 series, 8900 series, X8 series | 16 |
| | Summit X460, X480, X670, E4G-400 | 4 |
| | Summit X770, X670-G2, X460-G2 | 16 |
| | Summit X450-G2 | N/A |
| Multicast listener discovery (MLD) snooping per-VLAN filters—maximum number of VLANs supported in per-VLAN MLD snooping mode. | BlackDiamond e-series | 250 |
| | BlackDiamond 8800 c-series | 1,000 |
| | BlackDiamond 8900 c-series | 500 |
| | BlackDiamond 8900 xl-series | 2,000 |
| | BlackDiamond 8900-40G6X-xm | 500 |
| | BlackDiamond X8 a-series | 500 |
| | BlackDiamond X8 xl-series | 2,000 |
| | Summit X460, X450-G2, E4G-400 | 1,000 |
| | Summit X460-G2 | 1,200 |
| | Summit X480 | 2,000 |
| | Summit X440 | 250 |
| | Summit X670, E4G-200 | 500 |
| | Summit X770, X670-G2 | 1,200 |
| | Summit X450-G2 | 512 |
| Multicast listener discovery (MLD)v1 subscribers— maximum number of MLDv1 subscribers per port. ¹ | BlackDiamond 8800 c-series | 500 |
| | BlackDiamond xl-series, X8 Series | 1,500 |
| | Summit X440 | 750 |
| | Summit X460, X480, X670, E4G-400 | 1,500 |
| | Summit X770, X670-G2, X450-G2, X460-G2 | 4,000 |

Table 5: Supported Limits (continued)

| Metric | Product | Limit |
|--|--|--------|
| Multicast listener discovery (MLD)v1 subscribers —maximum number of MLDv1 subscribers per switch. ¹ | BlackDiamond 8800 series, X8 series | 10,000 |
| | Summit X440 | 5,000 |
| | Summit X460, X480, X670, E4G-400, X460-G2, X450-G2 | 10,000 |
| | Summit X770, X670-G2 | 30,000 |
| Multicast listener discovery (MLD)v2 subscribers —maximum number of MLDv2 subscribers per port. ¹ | BlackDiamond 8800 c-series | 500 |
| | BlackDiamond xl series | 2,500 |
| | BlackDiamond X8 series | 2,000 |
| | Summit X440, X450-G2, SummitStack | 1,000 |
| | Summit X460, X480, X670, E4G-400, Summit X770, X670-G2, X450-G2, X460-G2 | 2,000 |
| Multicast listener discovery (MLD)v2 subscribers —maximum number of MLDv2 subscribers per switch. ¹ | BlackDiamond 8800 series, BlackDiamond xl series | 10,000 |
| | Summit X440, SummitStack | 5,000 |
| | Summit X460, X480, X670, E4G-400, X460-G2, X450-G2 | 10,000 |
| | Summit X770, X670-G2 | 30,000 |
| Multicast listener discovery (MLD)v2 maximum source per group —maximum number of source addresses per group. | All platforms, except Summit X430 | 200 |
| Multicast listener discovery (MLD) SSM-map entries —maximum number of MLD SSM mapping entries. | All platforms | 500 |
| Multicast listener discovery (MLD) SSM-MAP entries —maximum number of sources per group in MLD SSM mapping entries. | All platform | 50 |
| Network login —maximum number of clients being authenticated on MAC-based VLAN enabled ports. | BlackDiamond 8000 series (clients per module/per system) | 1,024 |
| | BlackDiamond X8 series Summit series | |
| Network login —maximum number of clients being authenticated with policy mode enabled. | Summit X450-G2, X460-G2 | 1,024 |
| | Summit X670-G2, X770 | 512 |
| Network login —maximum number of dynamic VLANs. | All platforms | 2,000 |
| Network login VLAN VSAs —maximum number of VLANs a client can be authenticated on at any given time. | All platforms | 10 |
| ONEPolicy Roles/Profiles —maximum number of policy roles/profiles. | Summit X450-G2, X460-G2, X670-G2, X770 | 63 |
| | All other platforms | N/A |

Table 5: Supported Limits (continued)

| Metric | Product | Limit |
|---|--|---|
| ONEPolicy Rules per Role/Profile —maximum number of rules per role/policy. | Summit X450-G2 | IPv6 rules: 256 IPv4 rules: 256 L2 rules: 184 MAC rules: 256 |
| | Summit X460-G2 | IPv6 rules: 512 IPv4 rules: 512 L2 rules: 440 MAC rules: 512 |
| | Summit X770 | IPv6 Rules: 256 L2 Rules: 184 MAC Rules: 256 IPv4 Rules: 256 |
| | All other platforms | N/A |
| ONEPolicy Authenticated Users per Switch —maximum number of authenticated users per switch. | Summit X450-G2, X460-G2 Summit X670-G2, X770 All other platforms | Up to 1,024 Up to 512 N/A |
| | Summit X450-G2, X460-G2 Summit X670-G2, X770 All other platforms | 682–1,022 341–510 N/A |
| | Summit X450-G2, X460-G2 Summit X670-G2, X770 All other platforms | Unlimited up to 1,024 Unlimited up to 512 N/A |
| ONEPolicy Authenticated Users per Port —maximum number of authenticated users per port. | Summit X450-G2, X460-G2 Summit X670-G2, X770 All other platforms | Unlimited up to 1,024 Unlimited up to 512 N/A |
| | Summit X450-G2, X460-G2, X670-G2, X770 All other platforms | Up to 952 N/A |
| ONEPolicy Permit/Deny Traffic Classification Rules Types —total maximum number of unique permit/deny traffic classification rules types (system/stack). | Summit X450-G2, X460-G2, X670-G2, X770 All other platforms | 256 N/A |
| | Summit X450-G2, X460-G2, X670-G2, X770 All other platforms | 256 N/A |
| ONEPolicy Permit/Deny Traffic Classification Rules Types —maximum number of unique MAC permit/deny traffic classification rules types (macsource/macdest). | Summit X450-G2, X460-G2, X670-G2, X770 All other platforms | 256 N/A |
| | Summit X450-G2, X460-G2, X670-G2, X770 All other platforms | 256 N/A |
| ONEPolicy Permit/Deny Traffic Classification Rules Types —maximum number of unique IPv6 permit/deny traffic classification rules types (ipv6dest). | Summit X450-G2, X460-G2, X670-G2, X770 All other platforms | 256 N/A |
| | Summit X450-G2, X460-G2, X670-G2, X770 All other platforms | 256 N/A |

Table 5: Supported Limits (continued)

| Metric | Product | Limit |
|---|---|---|
| ONEPolicy Permit/Deny Traffic Classification Rules Types —maximum number of unique IPv4 permit/deny traffic classification rules (typesipsource / ipdest / ipfrag / udpsourceportIP / udpdestportIP / tcpsourceportIP / tcpdestportIP / ipttl / iptos / iptype). | Summit X450-G2, X460-G2, X670-G2, X770 All other platforms | 256 N/A |
| ONEPolicy Permit/Deny Traffic Classification Rules Types —maximum number of unique Layer 2 permit/deny traffic classification rules (ethertype/port). | Summit X450-G2, X460-G2, X670-G2, X770 All other platforms | 184 N/A |
| OSPFv2/v3 ECMP —maximum number of equal cost multipath OSPFv2 and OSPFv3. | All platforms, except Summit X450-G2, X440, X430, and E4G-200) BlackDiamond 8800 G48Te2 (for IPv6) Summit X450-G2 E4G-200 | 16 N/A 4 8 |
| OSPFv2 areas —as an ABR, how many OSPF areas are supported within the same switch. | All platforms (except X430, X440) | 8 |
| OSPFv2 external routes —recommended maximum number of external routes contained in an OSPF LSDB. | BlackDiamond 8000 series BlackDiamond 8900 xl-series BlackDiamond X8 series BlackDiamond X8 xl-series Summit X460, X670, X770, X670-G2, X460-G2, X450-G2 Summit X480 E4G-200, E4G-400 | 20,000 130,000 20,000 130,000 5,000 130,000 5,000 |
| OSPFv2 inter- or intra-area routes —recommended maximum number of inter- or intra-area routes contained in an OSPF LSDB with one ABR in OSPF domain. | BlackDiamond 8000 series, 8900 xl-series, X8 series Summit X460, X670, X670-G2, X460-G2 Summit X480, X770 Summit X450-G2 E4G-400 | 7,000 2,000 7,000 1,000 2,000 |
| OSPFv2 interfaces —recommended maximum number of OSPF interfaces on a switch (active interfaces only). | All platforms (except X430), with Advanced Edge license. All platforms (except X430 and X440) with Core license or higher | 4 400 |
| OSPFv2 links —maximum number of links in the router LSA. | All platforms, except Summit X450-G2, X770, and X430 Summit X450-G2 Summit X770 | 400 4 419 |

Table 5: Supported Limits (continued)

| Metric | Product | Limit |
|---|---|--------|
| OSPFv2 neighbors—maximum number of supported OSPF adjacencies. | BlackDiamond 8000 series | 128 |
| | BlackDiamond 8900 xl-series, X8 Series | 255 |
| | Summit X460, X670, X770, X440, X670-G2, X460-G2 | 128 |
| | Summit X480 | 255 |
| | Summit X450-G2 | 4 |
| OSPFv2 routers in a single area—recommended maximum number of routers in a single OSPF area. | E4G-400, E4G-200 | 128 |
| | BlackDiamond 8000 series, X8 series | 100 |
| | BlackDiamond 8900 xl-series | 200 |
| | Summit X460, X670, X770, X670-G2, X460-G2, X450-G2 | 50 |
| | Summit X480 | 200 |
| OSPFv2 virtual links—maximum number of supported OSPF virtual links. | E4G-400 | 50 |
| | All platforms (except X450-G2, X430, and X440) with Core license or higher | 32 |
| OSPFv3 areas—as an ABR, the maximum number of supported OSPFv3 areas. | Summit X450-G2 | 4 |
| | All platforms (except X430 and X440) with Core license or higher | 16 |
| OSPFv3 external routes—recommended maximum number of external routes. | All platforms (except X450-G2, X430, and X440) with Core license or higher | 32 |
| | BlackDiamond 8000 series, X8 series | 10,000 |
| | BlackDiamond X8 xl-series, 8900 xl-series | 60,000 |
| | Summit X460, X670, X770, X670-G2, X460-G2, X450-G2 | 10,000 |
| | Summit X480 | 60,000 |
| OSPFv3 inter- or intra-area routes—recommended maximum number of inter- or intra-area routes. | E4G-400 | 10,000 |
| | BlackDiamond 8000 series, 8900 xl-series, X8 series | 6,000 |
| | Summit X460, X670, X770, X670-G2, X460-G2, X450-G2 | 3,000 |
| | Summit X480 | 6,000 |
| | E4G-400 | 3,000 |
| OSPFv3 interfaces—maximum number of OSPFv3 interfaces. | All platforms (except X430) | 4 |
| | Note: Active interfaces only, with Advanced Edge license. (See below for Core license limits.) | |
| | BlackDiamond 8000 series, BlackDiamond X8 series | 256 |
| | BlackDiamond 8900 xl-series | 384 |
| | Summit X460, X670, X770 | 128 |
| | Summit X480 | 384 |
| | Summit X670-G2, X460-G2 | 256 |
| | E4G-200, E4G-400 | 256 |
| | Note: With Core license or higher. (See above for Advanced Edge license limits.) | |
| | | |
| OSPFv3 neighbors—maximum number of OSPFv3 neighbors. | All platforms (except X450-G2, X430, and X440) with Core license or higher | 16 |
| | BlackDiamond 8000 series, BlackDiamond X8 series | 64 |
| | BlackDiamond 8900 xl-series | 128 |
| | Summit X460, X670, X770, X670-G2, X460-G2, X450-G2 | 64 |
| | Summit X480 | 128 |
| OSPFv3 virtual links—maximum number of OSPFv3 virtual links supported. | E4G-400 | 64 |
| | All platforms (except X450-G2, X430, and X440) with Core license or higher | 16 |
| | Summit X450-G2 | 4 |

Table 5: Supported Limits (continued)

| Metric | Product | Limit |
|--|--|-------|
| PIM IPv4 (maximum interfaces) —maximum number of PIM active interfaces. | All platforms, except Summit X430, X450-G2, and X440 | 512 |
| | Summit X440 | 253 |
| | Summit X450-G2 | 4 |
| PIM IPv4 (maximum interfaces) —maximum number of PIM-snooping enabled interfaces. | All platforms, except Summit X430 | 512 |
| PIM IPv4 Limits —maximum number of multicast groups per rendezvous point. | All platforms, except Summit X430 | 180 |
| PIM IPv4 Limits —maximum number of multicast sources per group. | BlackDiamond 8800 (E-series modules) | 1,000 |
| | BlackDiamond 8800 (C-series modules) | 3,000 |
| | BlackDiamond 8800 (xl-series modules) | 4,000 |
| | BlackDiamond X8 | 3,000 |
| | Summit X460-G2, X670-G2, X770, X450-G2 | 5,000 |
| | Summit X460, X480 | 1,200 |
| | Summit X670-48x | 1,000 |
| | Summit X670-48t | 4,000 |
| | Summit X440 | 175 |
| PIM IPv4 Limits —maximum number of dynamic rendezvous points per multicast group. | All platforms, except Summit X430 | 145 |
| PIM IPv4 Limits —static rendezvous points. | All platforms, except Summit X430 | 32 |
| PIM IPv6 (maximum interfaces) —maximum number of PIM active interfaces. | All platforms, except Summit X450-G2 and X430 | 512 |
| | Summit X450-G2 | 4 |
| PIM IPv6 Limits —maximum number of multicast group per rendezvous point. | All platforms, except Summit X430 | 70 |
| PIM IPv6 Limits —maximum number of multicast sources per group. | BlackDiamond 8000 | 1,280 |
| | BlackDiamond X8 | 1,500 |
| | Summit X460-G2, X670-G2 | 2,500 |
| | Summit X460, X480 | 800 |
| | Summit X670 | 2,000 |
| | Summit X440 | 175 |
| | Summit X450-G2 | 2,000 |
| | Summit X770 | 2,500 |
| PIM IPv6 Limits —maximum number of dynamic rendezvous points per multicast group. | All platforms, except Summit X430 | 64 |
| PIM IPv6 Limits —maximum number of secondary address per interface. | All platforms, except Summit X430 | 70 |
| PIM IPv6 Limits —static rendezvous points. | All platforms, except the Summit X430 | 32 |

Table 5: Supported Limits (continued)

| Metric | Product | Limit |
|--|--|--|
| Policy-based routing (PBR) redundancy —maximum number of flow-redirects. | All platforms | 256° |
| Policy-based routing (PBR) redundancy —maximum number of next hops per each flow-direct. | All platforms | 32° |
| Port-specific VLAN tags —maximum number of port-specific VLAN tags. | All platforms, except Summit X450-G2, X440, and X430 | 1,023 |
| Port-specific VLAN tags —maximum number of port-specific VLAN tag ports. | BlackDiamond X8 and 8800 xl-series Summit X480 Summit X460-48t Summit X460-24x, X670-48x Summit X670V-48t Summit X670V-48t stack Summit X770, X670-G2 Summit X460-G2 E4G-400 E4G-200 | 8,090 3,800 7,200 3,400 3,600 7,200 6,400 4,000 3,400 3,800 |
| Private VLANs —maximum number of subscribers. Assumes a minimum of one port per network and subscriber VLAN. | BlackDiamond 8800 c-, e-, xl-series with eight modules of 48 ports 8900-G96T-c modules BlackDiamond X8 series Summit X770 Summit X670-G2, X670v-48t Summit X670 Summit X480 Summit X460-G2, X460 Summit X440 Summit X430 Summit X450-G2 E4G-200 E4G-400 | 383 767 103 63 47 23 53 25 27 51 11 33 |
| Private VLANs —maximum number of private VLANs with an IP address on the network VLAN. Note: This limit is dependent on the maximum number of private VLANs in an L2-only environment if the configuration has tagged and translated ports. | Summit X770, X670-G2, X460-G2, X450-G2 Summit X670, X480, X460, X460, X480 Summit X440 E4G-200, E4G-400 | 1,024 512 127 512 |

Table 5: Supported Limits (continued)

| Metric | Product | Limit |
|--|---|--|
| Private VLANs—maximum number of private VLANs in an L2-only environment. | BlackDiamond 8800 c-, e-series | 384 |
| | BlackDiamond 8900 series, X8 series | 2,046 |
| | E4G-200 | 597 |
| | E4G-400 | 1,280 |
| | Summit X440 | 127 |
| | Summit X480, Summit X670 | 597 |
| | Summit X460 | 820 |
| | Summit X770, X670-G2, X460-G2, X450-G2 Summit X430 | 1,280 255 |
| PTP/1588v2 Clock Ports | Summit X770, X460-G2, X670-G2, and E4G-200, E4G-400 cell site routers | 32 for boundary clock 1 for ordinary clock |
| PTP/1588v2 Clock Instances | Summit X770, X670-G2, X460-G2, and E4G-200, E4G-400 cell site routers | 2 combinations: <ul style="list-style-type: none"> Transparent clock + ordinary clock Transparent clock + boundary clock |
| PTP/1588v2 Unicast Static Slaves | Summit X770, X670-G2, X460-G2, and E4G-200, E4G-400 cell site routers | 40 entries per clock port |
| PTP/1588v2 Unicast Static Masters | Summit X770, X670-G2, X460-G2, and E4G-200, E4G-400 cell site routers | 10 entries per clock type |
| Route policies—suggested maximum number of lines in a route policy file. | All platforms | 10,000 |
| RIP Learned Routes—maximum number of RIP routes supported without aggregation. | All platforms, except Summit X430 | 10,000 |
| RIP neighbors—maximum number of RIP neighbors. | E4G-200 | 256 |
| RIP interfaces on a single router—recommended maximum number of RIP routed interfaces on a switch. | BlackDiamond 8000 series, X8 series | 256 |
| | BlackDiamond 8900 xl-series | 384 |
| | Summit X440 | 128 |
| | Summit X460, X670-G2, X460-G2 | 256 |
| | Summit X480 | 384 |
| | Summit X670, X770, X450-G2 E4G-400 | 256 256 |
| RIPng learned routes—maximum number of RIPng routes. | BlackDiamond 8000 series, X8 series | 3,000 |
| | BlackDiamond 8900 xl-series | 5,000 |
| | Summit X480 | 5,000 |
| | Summit X460, X670, X670-G2, X460-G2, X770, X450-G2 | 3,000 |
| | E4G-200 | 3,000 |

Table 5: Supported Limits (continued)

| Metric | Product | Limit |
|---|--|-------|
| Spanning Tree (maximum STPDs) —maximum number of Spanning Tree Domains on port mode EMISTP. | All platforms (except Summit X430, X440) | 64 |
| | Summit X440 | 32 |
| | Summit X430 | 16 |
| Spanning Tree PVST+ —maximum number of port mode PVST domains. Note: For all platforms, the maximum number of active ports per PVST domain depends on the maximum number of spanning tree ports supported on the given platform. For example, Summit X670-G2 supports 256 PVST domains (maximum) and 4,096 STP ports (maximum), so the maximum number of active ports per PVST domain is 16 ports (4,096 ÷ 256) | BlackDiamond X8 and 8900 series | 256 |
| | Summit X670, X770, X670-G2 | 256 |
| | Summit X460, X480, X440, X460-G2 | 128 |
| | Summit X430 | 50 |
| | Summit X450-G2 | 128 |
| | E4G-400 | 128 |
| Spanning Tree —maximum number of multiple spanning tree instances (MSTI) domains. | All platforms (except Summit X430, X440) | 64 |
| | Summit X430 | 5 |
| | Summit X440 | 32 |
| Spanning Tree —maximum number of VLANs per MSTI. Note: Maximum number of 10 active ports per VLAN when all 500 VLANs are in one MSTI. | BlackDiamond X8, 8800, 8900 MSM 128/XL | 500 |
| | Summit X770, X670-G2, X670v-48t, X670 | 500 |
| | Summit X480, X460-G2, X460, X450-G2 | 600 |
| | E4G-200 | 500 |
| | E4G-400 | 600 |
| | Summit X440 | 250 |
| | Summit X430 | 100 |
| Spanning Tree —maximum number of VLANs on all MSTP instances. | BlackDiamond X8, 8800, 8900 MSM 128/XL | 1,000 |
| | Summit X770 | 1,024 |
| | Summit X670-G2, X670v-48t, X670, X480 | 1,000 |
| | Summit X460-G2, X460, X450-G2 | 1,024 |
| | E4G-200 | 1,000 |
| | E4G-400 | 1,024 |
| | Summit X440 | 500 |
| | Summit X430 | 200 |
| Spanning Tree (802.1d domains) —maximum number of 802.1d domains per port. | All platforms | 1 |
| Spanning Tree (number of ports) —maximum number of ports including all Spanning Tree domains. | All platforms (except Summit X430, X440) | 4,096 |
| | Summit X430 | 1,024 |
| | Summit X440 | 2,048 |

Table 5: Supported Limits (continued)

| Metric | Product | Limit |
|---|--|-------------------------------|
| Spanning Tree (maximum VLANs) —maximum number of STP-protected VLANs (dot1d and dot1w). | BlackDiamond X8, 8800, 8900 MSM 128/XL | 1,024 |
| | Summit X770 | 1,024 |
| | Summit X670-G2, X670v-48t, X670, X480 | 560 |
| | Summit X460-G2, X460, X450-G2 | 600 |
| | E4G-200 | 500 |
| | E4G-400 | 600 |
| | Summit X440 | 500 |
| Summit X430 | 128 | |
| SSH (number of sessions) —maximum number of simultaneous SSH sessions. | All platforms | 8 |
| Static MAC multicast FDB entries —maximum number of permanent multicast MAC entries configured into the FDB. | BlackDiamond 8000 c-, e-, xl-series BlackDiamond X8 series All Summits E4G-200, E4G-400 | 1,024 |
| Syslog servers —maximum number of simultaneous syslog servers that are supported. | All platforms | 4 |
| Telnet (number of sessions) —maximum number of simultaneous Telnet sessions. | All platforms | 8 |
| TRILL —trees rooted from switch. | BlackDiamond X8 Summit X670, X770 | 1 |
| TRILL —computed trees. | BlackDiamond X8 Summit X670, X770 | 1 |
| TRILL —TRILL VLANs. | BlackDiamond X8 Summit X670, X770 | 4 |
| TRILL —forwarding VLANs. | BlackDiamond X8 Summit X670, X770 | 4,095 |
| TRILL —forwarding ports. | BlackDiamond X8 Summit X670, X770 | All |
| TRILL —RBridge FDB entries. | BlackDiamond X8 Summit X670 Summit X770 | 128,000 128,000 288,000 |
| TRILL —ECMP RBridge next hops. | BlackDiamond X8 Summit X670, X770 | 8 |
| TRILL —neighbor adjacencies. | BlackDiamond X8 Summit X670, X770 | 32 |
| TRILL —nodes. | BlackDiamond X8 Summit X670, X770 | 256 |
| TRILL —links. | BlackDiamond X8 Summit X670, X770 | 2,000 |

Table 5: Supported Limits (continued)

| Metric | Product | Limit |
|---|---|---|
| Virtual routers —maximum number of user-created virtual routers that can be created on a switch. Note: Virtual routers are not supported on Summit X440 series switches. | BlackDiamond 8000 c-, xl-, xm-series BlackDiamond X8 series Summit X460, X460-G2, X480, X670, X670-G2, X770, X450-G2 E4G-200, E4G-400 | 63 |
| Virtual router forwarding (VRFs) —maximum number of VRFs that can be created on a switch. Note: * Subject to other system limitations. | All platforms, except Summit X440 and X430 | 960 * |
| Virtual router protocols per VR —maximum number of routing protocols per VR. | All platforms, except Summit X440, X430 | 8 |
| Virtual router protocols per switch —maximum number of VR protocols per switch. | All platforms, except Summit X440, X430 | 64 |
| VLAN aggregation —maximum number of port-VLAN combinations on any one superVLAN and all of its subVLANs. | All platforms (except Summit X430, X440) Summit X440, X430 | 1,000 256 |
| VLANs —includes all VLANs. Note: ExtremeXOS supports only 4,092 user-configurable VLANs. (VLAN 1 is the default VLAN, and 4,095 is the management VLAN, and you may not configure them.) | All platforms | 4,094 |
| VLANs —maximum number of port-specific tag VLANs. | BlackDiamond 8800 xl-series only, BlackDiamond X8 series BlackDiamond X8 xl-series Summit X460, X770, X480, E4G-400, X670-G2, X460-G2 Summit X670, X670V-48t E4G-400 E4G-200 | 1,023 4,093 4,093 1,023 4,093 2,047 |
| VLANs —maximum number of port-specific tag VLAN ports. | BlackDiamond 8800 xl-series only BlackDiamond X8 BlackDiamond X8 xl-series E4G-400, E4G-200 Summit X460, X670, X670V-48t, X460-G2 Summit X770, X670-G2 Summit X480 | 4096 4096 32,767 4096 4096 8,192 16,383 |

Table 5: Supported Limits (continued)

| Metric | Product | Limit |
|---|---|---|
| VLANs (Layer 2) —maximum number of Layer 2 VLANs. | All platforms | 4,094 |
| VLANs (Layer 3) —maximum number of VLANs performing IPv4 and/or IPv6 routing. Excludes sub-VLANs. | BlackDiamond X8 Summit X460-G2, X670, X770, X670-G2, X450-G2 Summit X440 Summit X480, X460 E4G-200, E4G-400 | 2,048 2,048 254 512 512 |
| VLANs (maximum active port-based) —maximum active ports per VLAN when 4,094 VLANs are configured with default license. | BlackDiamond X8, 8800 series Summit X770, X670-G2, X670v-48t, X670, X480, X460-G2, X460, X450-G2 E4G-200 E4G-400 Summit X440 Summit X430 | 32 32 12 32 7 2 |
| VLANs (maximum active protocol-sensitive filters) —number of simultaneously active protocol filters in the switch. | All platforms, except Summit X450-G2 Summit X450-G2 | 15 16 |
| VLAN translation —maximum number of translation VLANs. Assumes a minimum of one port per translation and member VLAN. | BlackDiamond 8000 a-, c-, e-, xl series with eight modules of 48 ports 8900-G96T-c modules Summit X770 Summit X670-G2, X670v-48t Summit X670 Summit X480 Summit X460-G2 Summit X460 E4G-200 E4G-400 Summit X440 Summit X430 Summit X450-G2 | 383 767 103 63 47 53 53 57 11 33 25 27 51 |
| VLAN translation —maximum number of translation VLAN pairs with an IP address on the translation VLAN. Note: This limit is dependent on the maximum number of translation VLAN pairs in an L2-only environment if the configuration has tagged and translated ports. | Summit X770, X670-G2, X450-G2 Summit X670, X480, X460 Summit X440 E4G-200, E4G-400 | 1,024 512 127 512 |

Table 5: Supported Limits (continued)

| Metric | Product | Limit |
|---|---|---|
| VLAN translation —maximum number of translation VLAN pairs in an L2-only environment. | BlackDiamond 8800 c-, e-series BlackDiamond 8900 xl-series BlackDiamond X8 series Summit X460 Summit X430 Summit X480, X670, X670-G2, X460-G2 Summit X450-G2, X770 Summit X440 E4G-400, E4G-200 | 384 2,046 2,046 2,000 512 2,046 1,024 127 2,000 |
| VRRP (v2/v3-IPv4) (maximum instances) —maximum number of VRRP instances for a single switch, with Advanced Edge license or higher. | BlackDiamond X8 BlackDiamond 8800 MSM-48c and MSM-96 BlackDiamond 8900 xl-series 8900-MSM128 Summit X770, X670, X670-G2, X460-G2, X480, X450-G2 Summit X460 Summit X440 E4G-200, E4G-400 | 511 511 511 511 255 32 128 |
| VRRP (v3-IPv6) (maximum instances) —maximum number of VRRP instances for a single switch, with Advanced Edge license or higher. (VRRP-VRRPv3-IPv6) | BlackDiamond X8, BlackDiamond 8800 MSM-48c and MSM-96 BlackDiamond 8900 xl-series 8900-MSM128 Summit X770, X670, X670-G2, X460-G2, X450-G2 Summit X460, X480 Summit X440 E4G-200, E4G-400 | 511 511 511 511 255 15 255 |
| VRRP (v2/v3-IPv4/IPv6) (maximum VRID) —maximum number of unique VRID numbers per switch. | All platforms with Advanced Edge license or higher, except Summit X430 | 31 |
| VRRP (v2/v3-IPv4/IPv6) (maximum VRIDs per VLAN) —maximum number of VRIDs per VLAN. | All platforms with Advanced license or higher, except for Summit X430 | 31 |
| VRRP (v2/v3-IPv4/IPv6) (maximum ping tracks) —maximum number of ping tracks per VLAN. | All platforms with Advanced Edge license or higher, except Summit X430 | 8 |
| VRRP (maximum ping tracks) —maximum number of ping tracks per VRRP Instance under 128 VRRP instances, with Advanced Edge license or higher. | All platforms, except the Summit X440 Summit X440 Hello interval: 20 centiseconds Hello interval: 1 second | 8 (20 centisecond or 1 second hello interval) 1 |

Table 5: Supported Limits (continued)

| Metric | Product | Limit |
|---|--|---|
| VRRP (v3-IPv6) (maximum ping tracks)—maximum number of ping tracks per VRRP Instance under 128 VRRP instances, with Advanced Edge license or higher. | All platforms, except the Summit X440 | 8 (20 centisecond or 1 second hello interval) |
| | Summit X440 Hello interval: 20 centiseconds Hello interval: 1 second | 1 |
| VRRP (v2/v3-IPv4/IPv6) (maximum iproute tracks)—maximum number of IP route tracks per VLAN. | All platforms with Advanced Edge license or higher, except Summit X430 | 8 |
| VRRP (v2/v3-IPv4/IPv6)—maximum number of VLAN tracks per VLAN. | All platforms with Advanced Edge license or higher, except Summit X430 | 8 |
| XML requests—maximum number of XML requests per second. Note: Limits are dependent on load and type of XML request. These values are dynamic ACL data requests. | BlackDiamond 8800 c-series with 100 DACLs with 500 DACLs | 10 3 |
| | BlackDiamond 8800 c-series with 100 DACLs with 500 DACLs | 10 3 |
| | Summit X480, X670 with 100 DACLs with 500 DACLs | 4 1 |
| | Summit X450-G2 with 100 DACLs | 10 |
| XNV authentication—maximum number of VMs that can be processed (combination of local and network VMs). | All platforms, except Summit X430 and X450-G2 Summit X450-G2 | 2,048 1,024 |
| XNV database entries—maximum number of VM database entries (combination of local and network VMs). | All platforms, except Summit X430 | 16,000 |
| XNV database entries—maximum number of VPP database entries (combination of local and network VPPs). | All platforms, except Summit X430 | 2,048 |
| XNV dynamic VLAN—Maximum number of dynamic VLANs created (from VPPs / local VMs). | All platforms, except Summit X430 | 2,048 |

Table 5: Supported Limits (continued)

| Metric | Product | Limit |
|---|-----------------------------------|-----------------------------|
| XNV local VPPs—maximum number of XNV local VPPs. | All platforms, except Summit X430 | 2,048 ingress 512 egress |
| XNV policies/dynamic ACLs—maximum number of policies/dynamic ACLs that can be configured per VPP. | All platforms, except Summit X430 | 8 ingress 4 egress |
| XNV network VPPs—maximum number of XNV network VPPs. ^p | All platforms, except Summit X430 | 2,048 ingress 512 egress |

^a The table shows the total available.

^b Limit depends on setting configured for "configure forwarding external-tables".

^c When there are BFD sessions with minimal timer, sessions with default timer should not be used.

^d Based on in "none more-I2" mode.

^e Based on forwarding internal table configuration "more I2".

^f Effective capacity varies based on actual MAC addresses and VLAN IDs used and hash algorithm selected.

^g Based on "I2-only mode".

^h Based on forwarding internal table configuration "more I3-and-ipmc".

ⁱ Based on forwarding external table configuration "I3-only ipv4".

^j The limit depends on setting configured with configure iproute reserved-entries.

^k Based on forwarding external table configuration "I3-only ipv4".

^l Based on forwarding external table configuration "I3-only ipv6".

^m The IPv4 and IPv6 multicast entries share the same hardware tables, so the effective number of IPv6 multicast entries depends on the number of IPv4 multicast entries present and vice-versa.

ⁿ If IGMP and MLD are simultaneously configured on the switch, the number of effective subscribers supported would be appropriately lessened.

^o Sum total of all PBR next hops on all flow redirects should not exceed 4,096.

^p The number of XNV authentications supported based on system ACL limitations.

3 Open Issues, Known Behaviors, and Resolved Issues

Open Issues
Known Behaviors
Resolved Issues in ExtremeXOS 16.2.4-Patch1-3
Resolved Issues in ExtremeXOS 16.2.4
Resolved Issues in ExtremeXOS 16.2.3-Patch1-14
Resolved Issues in ExtremeXOS 16.2.3-Patch1-13
Resolved Issues in ExtremeXOS 16.2.3-Patch1-12
Resolved Issues in ExtremeXOS 16.2.3-Patch1-6
Resolved Issues in ExtremeXOS 16.2.3-Patch1-3
Resolved Issues in ExtremeXOS 16.2.3
Resolved Issues in ExtremeXOS 16.2.2-Patch1-3
Resolved Issues in ExtremeXOS 16.2.2
Resolved Issues in ExtremeXOS 16.2

This chapter lists open software issues, limitations in ExtremeXOS system architecture (known issues), and resolved issues in ExtremeXOS.

Open Issues

The following are new open issues for supported features found in ExtremeXOS 16.2.4-Patch1-3.

Table 6: Open Issues, Platform-Specific, and Feature Change Requests (CRs)

| CR Number | Description |
|--|---|
| General | |
| xos0048715 | IPv6 ECMP works for hardware-forwarded traffic, but does not work for slow-path traffic. Note: Either use BFD or ping protection to keep all router neighbors alive, or configure static neighbors and static FDB entries for all router neighbors. BFD or ping protection are the preferred methods. |
| xos0069662 | STP port state does not go to disabled state after the proposal in dot1d mode. However, the "d" flag appears, but state remains "forwarding". |
| BlackDiamond 8000 Series Switches | |
| xos0063621 | After 5 million internet routes are received from an upstream peer, BlackDiamond 8000 series switches experience a link flap, and then CPU utilization goes up to 78%. Note: Flush and relearn routes. |

Table 6: Open Issues, Platform-Specific, and Feature Change Requests (CRs) (continued)

| CR Number | Description |
|--|--|
| SummitStacks | |
| xos0063739 | On E4G-400 and Summit X440 stacks, with 256 Down MEPs, issuing the command <code>restart process dot1ag</code> generates the following error: <pre><Erro:cm.sys.actionErr> Slot-2: Error while loading "maintenancePoint": MP 12 Creation Failed due to HAL problem.</pre> |
| xos0064105 | On first-time boot up without any configuration on Summit X670v/X480 stacks, backup and standby nodes do not come to operational state and the following error message appears: <pre>04/13/2016 06:04:02.95 <Erro:HAL.Port.Error> Unable to get media type from slot 2 port 41 error -1 04/13/2016 06:04:02.95 <Erro:HAL.VLAN.Error> failed to setup qosprofile bandwidth port 2:41 unit 9 port 41 qos 0 minbw 0 maxbw 10000000 (Conduit failure) 04/13/2016 06:04:02.95 <Erro:HAL.VLAN.Error> failed to setup qosprofile bandwidth port 2:41 unit 9 port 41 qos 1 minbw 0 maxbw 10000000 (Conduit failure) 04/13/2016 06:04:02.95 <Erro:HAL.VLAN.Error> failed to setup qosprofile bandwidth port 2:41 unit 9 port 41 qos 2 minbw 0 maxbw 10000000 (Conduit failure)</pre> Also, all slots are continuously rebooting, except master node. Eventually, master and backup come to "in sync" state automatically, and then standby nodes go to "present" state instead of "operational" state. |
| xos0061909 | Creating an IPFIX mirroring instance to a monitor port, deleting the mirroring instance, and then recreating it again to a different monitor port, causes an error message, similar to the one below, to appear, and IPFIX mirroring does not work: <pre>Erro:HAL.Mirror.Error> Slot-1: Failed to create mirroring destination for slot 2, unit 9 Entry exists</pre> <p>Note: If the error appears in the log, disable and delete the mirror instance, and then add it back again.</p> |
| Summit X450-G2 | |
| xos0064736 | During severe congestion on Summit X450-G2 stacks, master slot reboots due to EPM watchdog expiration from memory depletion and stuck kernel. |
| BlackDiamond 8800 Series Switches | |
| xos0064579 | Support for dual hash needs to be enabled for BlackDiamond 8800 c-series modules. |
| BlackDiamond X8 Series Switches | |
| xos0069599 | If ports are restarted, or enabled and then disabled, configured VRRP pre-empting does not occur between the VRRP routers. |

Known Behaviors

The following are limitations in ExtremeXOS system architecture that have yet to be resolved.

Table 7: Known Issues, Platform-Specific, and Feature Change Requests (CRs)

| CR Number | Description |
|--|---|
| BlackDiamond 8000 Series Switches | |
| xos0062138 | Enabling, and then disabling VRRP fabric routing generates a HAL port error log messages similar to the following: <pre>7/18/2015 11:07:17.75 <Erro:HAL.Port.Error> MSM-A: Failed to configure static mac move behavior on port 1:2. 07/18/2015 11:07:17.76 <Erro:HAL.Port.Error> MSM-A: Failed to configure static mac move behavior on port 1:3. 07/18/2015 11:07:17.76 <Erro:HAL.Port.Error> MSM-A: Failed to configure static mac move behavior on port 1:4. 07/18/2015 11:07:17.76 <Erro:HAL.Port.Error> MSM-A: Failed to configure static mac move behavior on port 1:5.</pre> |
| BlackDiamond X8 Series Switches | |
| xos0063161 | For BlackDiamond 8800 and X8 series switches, when distributed ARP is turned on, a Layer-3 interface can have at most one load-share group. With more than one load-share group on a Layer-3 interface, packets can be dropped. |
| SummitStack | |
| xos0066970 | In the output of the <code>show fan</code> command, the fan tray revision and part number appears only for first fan tray in stack. |

Resolved Issues in ExtremeXOS 16.2.4-Patch1-3

The following issues were resolved in ExtremeXOS 16.2.4-Patch1-3. ExtremeXOS 16.2.4-Patch1-3 includes all fixes up to and including ExtremeXOS 11.6.5.3, and earlier, ExtremeXOS 12.0.5, ExtremeXOS 12.1.7, ExtremeXOS 12.2.2-patch1-12, ExtremeXOS 12.3.6, ExtremeXOS 12.4.5, ExtremeXOS 12.5.5, ExtremeXOS 12.6.3, ExtremeXOS 12.6.5, ExtremeXOS 12.7.1, ExtremeXOS 15.1.5, ExtremeXOS 15.2.4, ExtremeXOS 15.3.3, ExtremeXOS 15.4.1, ExtremeXOS 15.5.1, ExtremeXOS 15.5.2, ExtremeXOS 15.6.1, ExtremeXOS 15.6.2, ExtremeXOS 15.7.1, ExtremeXOS 16.1, ExtremeXOS 16.1.2, ExtremeXOS 16.1.3, ExtremeXOS 16.2, ExtremeXOS 16.2.2, and ExtremeXOS 16.2.3. For information about those fixes, see the release notes for the specific release.

Table 8: Resolved Issues, Platform-Specific, and Feature Change Requests (CRs) in ExtremeXOS 16.2.4-Patch1-3

| CR Number | Description |
|----------------|---|
| General | |
| xos0048459 | ACL Smart refresh does not occur when modifying the rules in an existing policy. |
| xos0058443 | Unconfiguring BFD VLAN re-configures the default BFD parameter for the VLAN. |
| xos0062785 | Need a mechanism to avoid configuring static route gateway and local IP as the same. |
| xos0066468 | CPU usage spikes for vlan and ipSecurity processes in backup node when IP security, policy, and NetLogin features are enabled on the same port. |

Table 8: Resolved Issues, Platform-Specific, and Feature Change Requests (CRs) in ExtremeXOS 16.2.4-Patch1-3 (continued)

| CR Number | Description |
|------------|---|
| xos0066935 | Files are not deleted in standby nodes after removing files in master node that were created through "save" operation. |
| xos0067270 | VRRP flap occurs with CPU congestion. |
| xos0067661 | With IP security DHCP-snooping enabled, the client port for DHCP snooped entry is not checkpointed to the backup node. |
| xos0068982 | In dot1x authentication, EAP request packets are sent without tags even though port is added as tagged. |
| xos0069418 | Policy, Python, and script files cannot be overwritten using SFTP in WinSCP client. |
| xos0069423 | When using Chalet to configure the sysContact and sysLocation, semicolon is not allowed. |
| xos0069450 | Unable to filter link up/down log events based on port number. |
| xos0069476 | A custom user cannot SSH into the switch if agent forwarding is enabled. |
| xos0069580 | The command <code>show configuration bfd</code> shows <code>enable bfd vln</code> even though it is not explicitly enabled. |
| xos0069604 | The process <code>rtmgr</code> ends unexpectedly with signal 11 after running <code>disable/enable ospf</code> in peer switch. |
| xos0069715 | Dynamically assigned IP addresses do not appear when an SNMP walk is done on OID 1.3.6.1.2.1.4.20 (IPAddrTable). |
| xos0069716 | The IPAddrTable If index entry contains the Index value corresponding to the Rt-interface, and not to the corresponding VLAN interface. |
| xos0069755 | Disabling an edge port incorrectly triggers a topology change. |
| xos0069806 | Number of simultaneous TCP session should be restricted during web-based NetLogin authentication. |
| xos0069808 | Kernel crash occurs when processing a IGMP packet with an invalid IP header length. |
| xos0065005 | Rtmgr process ends unexpectedly some times during frequent route transitions with Multicast, MPLS, and OSPF routes. |
| xos0069696 | Traffic is not forwarded in VPLS tunnel after disable/enable sharing on VMAN CEP ports. |
| xos0069800 | After ESRP failover L2VPN session remain in signaling state with ESRP VPLS redundancy enabled. |
| xos0069226 | Process <code>rtmgr</code> end unexpectedly with signal 11 when deleting, and then re-creating, the fabric connection. |
| xos0069691 | EXOS-VM displays <code>coreDumpWrite failed</code> error during bootup. |
| xos0062882 | Whole MIB compilation gets stuck at EXTREME-V2-TRAP MIB. |
| xos0066886 | Continuously, restarting MLAG ports causes brief loops. |
| xos0064192 | Kernel crash occurs randomly when unconfiguring the switch with a loop in topology. |

Table 8: Resolved Issues, Platform-Specific, and Feature Change Requests (CRs) in ExtremeXOS 16.2.4-Patch1-3 (continued)

| CR Number | Description |
|-------------------------------------|---|
| xos0066036 | Kernel crash occurs when sending multicast traffic over private VLAN. |
| xos0065300 | Kernel crash occurs when there are continuous new multicast streams with PIM SM configuration. |
| xos0070169 | NetLogin Dot1x authentication fails when port is not part of any default VLAN. |
| Summit X440 Series Switches | |
| xos0069740 | In Summit X440-L2-24t series switches, show fan output displays fan state as "Failed" when RPM is 0. |
| BlackDiamond Series Switches | |
| xos0067359 | On BlackDiamond switches, LLDP is disabled by default. |
| xos0069587 | On BlackDiamond 8800 series switches, fabric congestion occurs when traffic ingresses on a specific set of ports. |
| xos0069586 | On BlackDiamond X8 series switches, need to change the fabric hashing that facilitates the usage of redundant FM. |
| SummitStack | |
| xos0058419 | After rebooting a stack, error messages similar to the following appear for ports belonging to LAGs: <pre> Erro:cm.sys.actionErr> Slot-2: Error while loading "ports": Speed change is not allowed on port 2:6 as it is a trunk member port. </pre> |
| xos0069058 | LACP packets are sent with VLAN tag 0 from backup node on a SummitStack. |
| xos0069823 | The output of the show fan command reports 0 RPM for other stack node's fans intermittently. |

Resolved Issues in ExtremeXOS 16.2.4

The following issues were resolved in ExtremeXOS 16.2.4. ExtremeXOS 16.2.4 includes all fixes up to and including ExtremeXOS 11.6.5.3, and earlier, ExtremeXOS 12.0.5, ExtremeXOS 12.1.7, ExtremeXOS 12.2.2-patch1-12, ExtremeXOS 12.3.6, ExtremeXOS 12.4.5, ExtremeXOS 12.5.5, ExtremeXOS 12.6.3, ExtremeXOS 12.6.5, ExtremeXOS 12.7.1, ExtremeXOS 15.1.5, ExtremeXOS 15.2.4, ExtremeXOS 15.3.3, ExtremeXOS 15.4.1, ExtremeXOS 15.5.1, ExtremeXOS 15.5.2, ExtremeXOS 15.6.1, ExtremeXOS 15.6.2, ExtremeXOS 15.7.1, ExtremeXOS 16.1, ExtremeXOS 16.1.2, ExtremeXOS 16.1.3, ExtremeXOS 16.2, ExtremeXOS 16.2.2, and ExtremeXOS 16.2.3. For information about those fixes, see the release notes for the specific release.

Table 9: Resolved Issues, Platform-Specific, and Feature Change Requests (CRs) in ExtremeXOS 16.2.4

| CR Number | Description |
|------------------------------------|--|
| General | |
| xos0068002 | File system check of /dev/hda8 failed error occurs during switch power cycle after "manufacture-init". |
| xos0068086 | The command <code>show port transceiver/configuration</code> does not display information for certain (manufactured in 2014) FINISAR optics (40GBase-SR4). |
| xos0068687 | Multicast traffic sent to host randomly stops after enabling OnePolicy with PVID 4095. |
| xos0068840 | NetLogin process ends unexpectedly with signal 11, when client sends logoff message before completing the authentication process. |
| xos0068888 | When the command <code>show tech-support all detail</code> is executed after running " <code>enable cli-config-logging</code> ", messages beginning with "serial unknown" appear in the log. This issue also occurs when executed from a Telnet session. |
| xos0069051 | After 65,000 new FDB entries are learned, subsequent entries are continuously added and deleted. |
| xos0069061 | Exsshd process ends unexpectedly with signal 11 during stack failover. |
| xos0069114 | The <code>show configuration</code> command output displays additional word "minutes" under "aaa" module when lockout-time-period is configured. |
| xos0069150 | In the output of the <code>show vlan</code> command, ports can have both "!" and "*" flags set if the port is a share group port. |
| xos0069180 | Cannot configure some IP security features after removing and adding ports from VLANs. |
| xos0069196 | Inconsistent port learning flag was seen in HAL with PVLAN and MLAG configuration. |
| xos0069210 | Unable to create private VLAN with 32-character name if the first 31 characters match an existing private VLAN name. |
| xos0067515 | VPWS traffic forwarding stops after performing failover in the switch. |
| xos0067587 | When running <code>show tech-support</code> command with user-created VRs, <code>show configuration</code> command does not display full configuration. |
| Summit X670 Series Switches | |
| xos0069262 | Kernel oops occurs in Summit X670-G2 series switches due to incorrect calculation of physical address. |
| Summit X770 Series Switches | |
| xos0069487 | HAL process ends unexpectedly with signal 6 when switch boots up with PTP configurations. |

Table 9: Resolved Issues, Platform-Specific, and Feature Change Requests (CRs) in ExtremeXOS 16.2.4 (continued)

| CR Number | Description |
|-----------------|--|
| Security | |
| xos0069140 | <p>The following are ExtremeXOS vulnerabilities due to scripting allowed when in FIPS mode:</p> <ul style="list-style-type: none"> • Escape from EXSH restricted shell (CVE-2017-14331) • Information disclosure (CVE-2017-14327) • Privilege Escalation (root interactive shell) (CVE-2017-14329) • Privilege Escalation (root interactive shell) (CVE-2017-14330) <p>The following are additional ExtremeXOS vulnerabilities:</p> <ul style="list-style-type: none"> • Denial-of-service (CVE-2017-14328). • Session hijacking (CVE-2017-14332). <p>For more information about these vulnerabilities, see Vulnerability Notice on page 32.</p> |

Resolved Issues in ExtremeXOS 16.2.3-Patch1-14

The following issues were resolved in ExtremeXOS 16.2.3-Patch1-14. ExtremeXOS 16.2.3-Patch1-14 includes all fixes up to and including ExtremeXOS 11.6.5.3, and earlier, ExtremeXOS 12.0.5, ExtremeXOS 12.1.7, ExtremeXOS 12.2.2-patch1-12, ExtremeXOS 12.3.6, ExtremeXOS 12.4.5, ExtremeXOS 12.5.5, ExtremeXOS 12.6.3, ExtremeXOS 12.6.5, ExtremeXOS 12.7.1, ExtremeXOS 15.1.5, ExtremeXOS 15.2.4, ExtremeXOS 15.3.3, ExtremeXOS 15.4.1, ExtremeXOS 15.5.1, ExtremeXOS 15.5.2, ExtremeXOS 15.6.1, ExtremeXOS 15.6.2, ExtremeXOS 15.7.1, ExtremeXOS 16.1, ExtremeXOS 16.1.2, ExtremeXOS 16.1.3, ExtremeXOS 16.2, ExtremeXOS 16.2.2, and ExtremeXOS 16.2.3. For information about those fixes, see the release notes for the specific release.

Table 10: Resolved Issues, Platform-Specific, and Feature Change Requests (CRs) in ExtremeXOS 16.2.3-Patch1-14

| CR Number | Description |
|----------------|--|
| General | |
| xos0068323 | In ExtremeXOS Python scripting, the argument sent to the command <code>Exsh.clicmd</code> is replicated 24 times. |
| xos0068325 | Custom web page does not display image in Netlogin web-based authentication when IP address of Netlogin VLAN is used to login from browser. |
| xos0068767 | Trap receiver configuration is not saved in ExtremeXOS when configured from Extreme Management Center. |
| xos0068911 | After enabling STP auto-bind on a VLAN, removing all ports from the VLAN, and then adding them back, displays STP tag as "(none)" in the <code>show ports information detail</code> command. |
| xos0069070 | The process BCMAsync stops processing with scaled route/ARP entries in hash table. |

Table 10: Resolved Issues, Platform-Specific, and Feature Change Requests (CRs) in ExtremeXOS 16.2.3-Patch1-14 (continued)

| CR Number | Description |
|--|--|
| xos0069220 | Users can access Chalet by easily guessing the login session ID created by an existing session. |
| xos0067280 | Uploading a file using SFTP creates a read-only file on the switch. |
| xos0068785 | L2PT packets fail to switch over to backup path during failover. |
| xos0068057 | HAL process ends unexpectedly with signal 6 and 11 when deleting and re-adding subscriber VLAN from private VLAN. |
| xos0067459 | HA process ends unexpectedly with signal 11 while sending L3 known traffic over PVLAN configuration. |
| xos0057140 | Transceiver information for 40G Q+SR4 optic module shows invalid power and threshold values. |
| xos0066726 | Hal process ends unexpectedly with signal 11 when trying to add a port to the network VLAN of PVLAN. |
| SummitStack | |
| xos0068500 | HAL timeout occurs while rebooting the stack using the command <code>reboot stack-topology</code> . |
| BlackDiamond X8 Series Switches | |
| xos0063830 | On BlackDiamond X8 series switches, fan tray and FM LEDs behave incorrectly when fan tray is hot swapped. BDX8. |
| xos0067644 | On BlackDiamond X8 series switches, the I/O module status LED shows the incorrect status when MM-A module is removed from the chassis. |

Resolved Issues in ExtremeXOS 16.2.3-Patch1-13

The following issues were resolved in ExtremeXOS 16.2.3-Patch1-13. ExtremeXOS 16.2.3-Patch1-13 includes all fixes up to and including ExtremeXOS 11.6.5.3, and earlier, ExtremeXOS 12.0.5, ExtremeXOS 12.1.7, ExtremeXOS 12.2.2-patch1-12, ExtremeXOS 12.3.6, ExtremeXOS 12.4.5, ExtremeXOS 12.5.5, ExtremeXOS 12.6.3, ExtremeXOS 12.6.5, ExtremeXOS 12.7.1, ExtremeXOS 15.1.5, ExtremeXOS 15.2.4, ExtremeXOS 15.3.3, ExtremeXOS 15.4.1, ExtremeXOS 15.5.1, ExtremeXOS 15.5.2, ExtremeXOS 15.6.1, ExtremeXOS 15.6.2, ExtremeXOS 15.7.1, ExtremeXOS 16.1, ExtremeXOS 16.1.2, ExtremeXOS 16.1.3, ExtremeXOS 16.2, ExtremeXOS 16.2.2, and ExtremeXOS 16.2.3. For information about those fixes, see the release notes for the specific release.

Table 11: Resolved Issues, Platform-Specific, and Feature Change Requests (CRs) in ExtremeXOS 16.2.3-Patch1-13

| CR Number | Description |
|----------------|---|
| General | |
| xos0067824 | STP BPDUs are continuously sent after enabling and disabling MSTP on an STP port. |

Resolved Issues in ExtremeXOS 16.2.3-Patch1-12

The following issues were resolved in ExtremeXOS 16.2.3-Patch1-12. ExtremeXOS 16.2.3-Patch1-12 includes all fixes up to and including ExtremeXOS 11.6.5.3, and earlier, ExtremeXOS 12.0.5, ExtremeXOS 12.1.7, ExtremeXOS 12.2.2-patch1-12, ExtremeXOS 12.3.6, ExtremeXOS 12.4.5, ExtremeXOS 12.5.5, ExtremeXOS 12.6.3, ExtremeXOS 12.6.5, ExtremeXOS 12.7.1, ExtremeXOS 15.1.5, ExtremeXOS 15.2.4, ExtremeXOS 15.3.3, ExtremeXOS 15.4.1, ExtremeXOS 15.5.1, ExtremeXOS 15.5.2, ExtremeXOS 15.6.1, ExtremeXOS 15.6.2, ExtremeXOS 15.7.1, ExtremeXOS 16.1, ExtremeXOS 16.1.2, ExtremeXOS 16.1.3, ExtremeXOS 16.2, ExtremeXOS 16.2.2, and ExtremeXOS 16.2.3. For information about those fixes, see the release notes for the specific release.

Table 12: Resolved Issues, Platform-Specific, and Feature Change Requests (CRs) in ExtremeXOS 16.2.3-Patch1-12

| CR Number | Description |
|----------------|---|
| General | |
| xos0054568 | ESVT fails to function with jumbo-sized loopback frames. The <code>show esvt traffic-test</code> output indicates the test completed successfully, but no frame counts are indicated. |
| xos0064680 | STP port-specific configuration is lost after disabling load sharing or moving the port to a different VLAN. |
| xos0064798 | Configured port's STP properties are lost when the port is moved from one VLAN to another. |
| xos0066072 | The command <code>configure ports rate-limit flood out-actions disable-port</code> does not take effect until the command <code>clear meter out-of-profile</code> is executed. |
| xos0066962 | Port does not link up properly with GBIC Source Photonics 100FX SPGFEXCDFCEX. |
| xos0067161 | LACP flap occurs when disabling the mirror on port where LAG is configured with LACP. |
| xos0067546 | EPM process ends unexpectedly when SSH process is restarted while SNMP query on memory statistics is still in progress. |
| xos0067841 | Packets are dropped at ingress port for traffic at a rate greater than 1,000 pps when 500 ACLs are installed. |
| xos0068556 | SSH with command argument as "show commands" is not working with user account. |
| xos0068750 | AAA process ends unexpectedly with signal 11 when processing a corrupted RADIUS-challenge packet. |
| xos0068752 | Kernel crash occurs when processing a packet with an invalid IP header length. |
| xos0068810 | SNMP walk on entPhysicalClass returns Other(1) instead of Fan(7) for fan trays. |
| xos0068454 | In ISP mode, if no ports are associated with the NetLogin VLAN, then the client cannot access the base URL. |

Table 12: Resolved Issues, Platform-Specific, and Feature Change Requests (CRs) in ExtremeXOS 16.2.3-Patch1-12 (continued)

| CR Number | Description |
|-----------------------------|---|
| Summit X440 Series Switches | |
| xos0068754 | On ExtremeSwitching X440-8p switches, ports do not link up with the 100FX No phy optics with part number 10067. |

Resolved Issues in ExtremeXOS 16.2.3-Patch1-6

The following issues were resolved in ExtremeXOS 16.2.3-Patch1-6. ExtremeXOS 16.2.3-Patch1-6 includes all fixes up to and including ExtremeXOS 11.6.5.3, and earlier, ExtremeXOS 12.0.5, ExtremeXOS 12.1.7, ExtremeXOS 12.2.2-patch1-12, ExtremeXOS 12.3.6, ExtremeXOS 12.4.5, ExtremeXOS 12.5.5, ExtremeXOS 12.6.3, ExtremeXOS 12.6.5, ExtremeXOS 12.7.1, ExtremeXOS 15.1.5, ExtremeXOS 15.2.4, ExtremeXOS 15.3.3, ExtremeXOS 15.4.1, ExtremeXOS 15.5.1, ExtremeXOS 15.5.2, ExtremeXOS 15.6.1, ExtremeXOS 15.6.2, ExtremeXOS 15.7.1, ExtremeXOS 16.1, ExtremeXOS 16.1.2, ExtremeXOS 16.1.3, ExtremeXOS 16.2, ExtremeXOS 16.2.2, and ExtremeXOS 16.2.3. For information about those fixes, see the release notes for the specific release.

Table 13: Resolved Issues, Platform-Specific, and Feature Change Requests (CRs) in ExtremeXOS 16.2.3-Patch1-6

| CR Number | Description |
|------------|---|
| General | |
| xos0062013 | SNMP table extremePortUtilizationExtnTable displays inaccurate value. |
| xos0065400 | VLAN name and tag do not appear correctly when VLAN is created with VLAN name as "tag". |
| xos0066741 | Exsh process ends unexpectedly with signal 6 when downloading the configuration using Zero Touch Provisioning (ZTP) with the DHCP option provided by DHCP server. |
| xos0066923 | Need commands to configure "reload-delay" timer for MLAG ports. |
| xos0066984 | RADIUS-accounting request packet shows incorrect account-terminate reason for user logout from SSH session. |
| xos0067063 | Rtlookup is not able to display all the ECMP routes. |
| xos0067108 | Packets received on STP-blocked ports get forwarded to other STP ports when NetLogin and ONEPolicy are enabled with authentication mode optional. |
| xos0067182 | Authentication on switch using RSA keys stops working if one of the user keys is deleted. |
| xos0067227 | IDMgr entries are not flushed when ARP fast-convergence is on. |
| xos0067323 | FDBs are learned on incorrect VPLS peer on PE switches after include/exclude dot1q tag in P switch. |
| xos0067739 | UDP configuration is lost after reboot with IP DAD enabled. |
| xos0067822 | Memory leak occurs in XMLD process whenever Chalet session refresh happens. |

Table 13: Resolved Issues, Platform-Specific, and Feature Change Requests (CRs) in ExtremeXOS 16.2.3-Patch1-6 (continued)

| CR Number | Description |
|--|--|
| xos0068356 | Informational messages appear on the console when an NTP-enabled VLAN becomes inactive. |
| xos0068191 | Nettools process ends unexpectedly with signal 11 while rebooting the switch with 100+ DHCP clients connected via Relay and with Smart Relay enabled. |
| xos0066483 | The encrypted shared secret for TACAS accounting secondary servers does not appear in the configuration. |
| xos0067206 | Unable to login to Chalet with any account that uses an ampersand (&) character. |
| xos0068023 | Hash collision warning message appears with invalid VRID when exceeding hash table limit. |
| xos0066366 | On VPLS network with LAG on access side, clearing FDB on LSRs and LERs results in traffic drop. |
| xos0067271 | FDB mismatch occurs between software and hardware after deleting, and then adding, ISC port multiple times. |
| xos0064790 | Number of used "L4 Port Ranges" count is incorrect in <code>show access-list usage acl-range port</code> output after unconfiguring few ACL rules with "L4 port range" match condition. |
| xos0068374 | With OSPFv3 16-way ECMP, rtlookup for destination shows multiple duplicate entries. |
| xos0063669 | Erro:RtMgr.Client.ReplyTimeOut messages appear after run failover/reboot: <pre><Warn:EPM.hello_rate> Slot-2: Received hellos from process rtmgr 2 more often then expected 3 <Erro:RtMgr.Client.ReplyTimeOut> Slot-2: Client with ID=0x00000012 Timed out waiting for (ADDUPDRTE). <Erro:RtMgr.Client.ReplyTimeOut> Slot-2: Client with ID=0x00000012 Timed out waiting for (RTEGET).</pre> |
| xos0066179 | In Summit X440-24t and E4G-200 series switches, <code>show fan</code> output displays fan state as "Failed" when RPM is 0. |
| xos0067087 | CFM LMR/DMR packets are sent with dot1p value 0. |
| xos0068244 | Error message "Function Pointer Database is not fully initialized" appears during switch bootup with default configuration. |
| xos0066782 | BFD session ends when removing CVID from a service VMAN port. |
| xos0067704 | The process exsh ends unexpectedly after issuing command with include option that uses # via SSH script. |
| xos0068828 | FDB is not learned when ONEPolicy is enabled on the port with authentication mode optional, and the client fails the authentication. |
| BlackDiamond 8800 Series Switches | |
| xos0067807 | On BlackDiamond 8800 series switches, the VRRP process monopolizes 40-50% CPU after disable/enable slot, or after <code>restart ports all</code> when the switch has VRRP enabled on 120 STP-protected VLANs. |

Table 13: Resolved Issues, Platform-Specific, and Feature Change Requests (CRs) in ExtremeXOS 16.2.3-Patch1-6 (continued)

| CR Number | Description |
|---------------------------------|--|
| xos0065937 | Support for dual hash needs to be enabled for BlackDiamond 8800 c-series modules. |
| Summit X670-48t Switches | |
| xos0067652 | After a link-flap, combo ports on Summit X670V-48t switches do not link up sometimes using fiber connection. |

Resolved Issues in ExtremeXOS 16.2.3-Patch1-3

The following issues were resolved in ExtremeXOS 16.2.3-Patch1-3. ExtremeXOS 16.2.3-Patch1-3 includes all fixes up to and including ExtremeXOS 11.6.5.3, and earlier, ExtremeXOS 12.0.5, ExtremeXOS 12.1.7, ExtremeXOS 12.2.2-patch1-12, ExtremeXOS 12.3.6, ExtremeXOS 12.4.5, ExtremeXOS 12.5.5, ExtremeXOS 12.6.3, ExtremeXOS 12.6.5, ExtremeXOS 12.7.1, ExtremeXOS 15.1.5, ExtremeXOS 15.2.4, ExtremeXOS 15.3.3, ExtremeXOS 15.4.1, ExtremeXOS 15.5.1, ExtremeXOS 15.5.2, ExtremeXOS 15.6.1, ExtremeXOS 15.6.2, ExtremeXOS 15.7.1, ExtremeXOS 16.1, ExtremeXOS 16.1.2, ExtremeXOS 16.1.3, ExtremeXOS 16.2, ExtremeXOS 16.2.2, and ExtremeXOS 16.2.3. For information about those fixes, see the release notes for the specific release.

Table 14: Resolved Issues, Platform-Specific, and Feature Change Requests (CRs) in ExtremeXOS 16.2.3-Patch1-3

| CR Number | Description |
|----------------|---|
| General | |
| xos0065946 | SNMP get for lldpRemSysCapSupported MIB returns incorrect value. |
| xos0066477 | Creating a VLAN starting with "vr" causes syntax recognition problems with the <code>show iparp vr</code> command. |
| xos0066557 | Kernel crash occurs after removing a subVLAN from one VR and adding the same subVLAN in another VR. |
| xos0066775 | Configured peer group capabilities and policies are not reflected after creating a new BGP neighbor. |
| xos0066932 | Actual/configured sFlow sample rates are different after reconfiguring. |
| xos0066996 | ESRP does not update the neighbor state properly while becoming master from neutral state. |
| xos0067002 | UPM status is "fail" if UPM profile has <code>save configuration as-script</code> as the last command. |
| xos0067079 | ACL installation for the policy authenticated client is failing when diffserv replacement and meter configuration is present in the switch. |
| xos0067325 | After recovering from multiple link failures, ERPS incorrectly keeps both the ring links in blocked state. |
| xos0067335 | Memory leak occurs in VMT process when it is enabled on the port. |
| xos0067506 | A few VRRP instances remain in dual master state if VRRP state changes for several VLANs in the same VRID within a short time period. |

Table 14: Resolved Issues, Platform-Specific, and Feature Change Requests (CRs) in ExtremeXOS 16.2.3-Patch1-3 (continued)

| CR Number | Description |
|--|--|
| xos0067887 | Switch reboots unexpectedly when there are continuous SSH attempts and those attempts are rejected with access-profile. |
| xos0067912 | The command <code>show port protocol filter</code> displays the "Error: Configuration reply is too big" in output. |
| xos0068209 | PIM process ends unexpectedly with signal 11. |
| xos0049630 | Configuring DNS server in user VR gets added to VR-default. |
| xos0065527 | Edge safeguard configuration gets lost when ports are removed and added back to default VLAN. |
| xos0067583 | Add support to configure ping success for VRRP track-ping. |
| xos0067973 | After run failover, IDM kerberos system ACLAs are missing for some users in new master. |
| xos0062668 | MIB compilation issues occur with VLAN MIB when using mgsoft. |
| xos0065354 | Kernel error "packet number to save out of range: 49" occurs when DOS protect is enabled in the switch. |
| xos0065930 | ACLCBFUNC log occurs after associating a policy that has CLEAR-flow and network-zone configuration. |
| xos0066921 | ARP fails to resolve for some hosts. |
| xos0066986 | OSPF E1 routes in NSSA area are removed or not updated properly in the routing table. |
| xos0067084 | FDB is not learned over pseudowire after disabling, and then enabling, learning on network VLAN ports. |
| xos0068099 | After rebooting the switch, BGP neighbor configuration is lost when a peer group is configured. |
| xos0066697 | Delay occurs in password prompt appearing when trying to establish SSH connection. |
| xos0067106 | In dot1x authorization, service unavailable vlan port is re-authenticated in every authorization causing blocked port. |
| xos0066963 | Jumbo frame is disabled on master port after rebooting when ports are partitioned. |
| xos0060343 | On Summit X670v stack, configuration file replication on standby nodes times out after second or third failover. |
| xos0067446 | "ACL filter update failed" error occurs when modifying the code point value. |
| xos0065571 | Ping fails over L3VPN tunnel when the corresponding ARPs are in Layer 3 hardware hash table as "Extended View". Affects Summit X450-G2, X670-G2, and X770 series switches. |
| Summit X430 Series Switches | |
| xos0067014 | On X430 series switches, Netlogin web-based authentication is not working. |
| BlackDiamond 8800 Series Switches | |

Table 14: Resolved Issues, Platform-Specific, and Feature Change Requests (CRs) in ExtremeXOS 16.2.3-Patch1-3 (continued)

| CR Number | Description |
|--|--|
| xos0064870 | BlackDiamond 8800 series switches slots fail sometimes when applying PVLAN and STP configuration. |
| BlackDiamond X8 Series Switches | |
| xos0067283 | In BlackDiamond X8 series switches, the link remains in ready state after rebooting with SP7051-EXT 10Gb-T RJ45 transceiver. |
| NWI Series Switches | |
| xos0067397 | Kernel error message appears when configuring dot1p examination inner-tag: <Error:Kern.Error> inner dot1p filter failed in Create unit 0, rv -6 |
| Summit X670G2 Series Switches | |
| xos0066844 | Port with copper SFP inserted appears as active even if it is administratively disabled. |
| SummitStack | |
| xos0067096 | Multicast traffic is dropped on front panel port 1:1 when management port goes down on stacking switch. |
| xos0058499 | In SummiStack, the snmpEngine values are maintained in each node separately instead of a single value, which is causing different values on each failover. |

Resolved Issues in ExtremeXOS 16.2.3

The following issues were resolved in ExtremeXOS 16.2.3. ExtremeXOS 16.2.3 includes all fixes up to and including ExtremeXOS 11.6.5.3, and earlier, ExtremeXOS 12.0.5, ExtremeXOS 12.1.7, ExtremeXOS 12.2.2-patch1-12, ExtremeXOS 12.3.6, ExtremeXOS 12.4.5, ExtremeXOS 12.5.5, ExtremeXOS 12.6.3, ExtremeXOS 12.6.5, ExtremeXOS 12.7.1, ExtremeXOS 15.1.5, ExtremeXOS 15.2.4, ExtremeXOS 15.3.3, ExtremeXOS 15.4.1, ExtremeXOS 15.5.1, ExtremeXOS 15.5.2, ExtremeXOS 15.6.1, ExtremeXOS 15.6.2, ExtremeXOS 15.7.1, ExtremeXOS 16.1, ExtremeXOS 16.1.2, ExtremeXOS 16.1.3, ExtremeXOS 16.2, and ExtremeXOS 16.2.2. For information about those fixes, see the release notes for the specific release.

Table 15: Resolved Issues, Platform-Specific, and Feature Change Requests (CRs) in ExtremeXOS 16.2.3

| CR Number | Description |
|----------------|---|
| General | |
| xos0067463 | Traffic does not distribute across LSPs and LAG after enabling L2VPN sharing feature. |
| xos0052786 | BGP aggregation command demands global unicast addresses (GUA) and does not work with IPv6 unicast addresses. |
| xos0054222 | Unable to add second IPv6 address prefix to the network-zone after adding IPv4 address. |

Table 15: Resolved Issues, Platform-Specific, and Feature Change Requests (CRs) in ExtremeXOS 16.2.3 (continued)

| CR Number | Description |
|------------|---|
| xos0064727 | On DHCPv6 clients, sometimes the IPv6 address is not removed even after disabling the client, and after rebooting, the IPv6 address is saved and this causes the client to go into a stopped state with the following error message appearing: <Error:vlan.AddIPAddrFail> Failed to add IP addr 8001::4aa6:dd38:9b32:e7b/128 from DHCPv6 to VLAN client, DHCPv6 configured IPv6 address already exist on interface client |
| xos0064806 | Switch session stops responding after configuring SSH2 pre-generated private key with a length greater than 4,064 characters. |
| xos0066590 | In an MLAG peer when its MLAG port is down, the following error appears: "Group <ip> not found for VLAN". |
| xos0067055 | Log message "Process exsshd sends hello too often" appears when SSH is enabled in the switch. |
| xos0067194 | Topology change notification is not generated for the STP domain dot1d mode when there is change in the topology. |
| xos0067203 | Multicast packets are flooded on EAPS-blocked ports after removing and then adding ports configured with PSTAG. |
| xos0064672 | Incorrect state observed for DHCPv6 client when restarting the nettools process or rebooting the switch. |
| xos0064864 | Switch can go into reboot loop if the length of configured SSH private key is different from the actual key stored in EEPROM. This can happen when you attempt to configure an invalid key or when loading a .cfg file containing an SSH private key from another switch onto a new switch with default setting. To recover, at the console prompt, halt the image loading operation at the bootrom prompt, and then execute <code>config none</code> to bypass loading the configuration file containing the invalid or incorrect SSH private key. Workaround: If you want to use a backup configuration (.cfg) file containing an SSH private key from a different switch, then open the configuration file in any editor and remove the <code>exos-module-exsshd</code> configuration lines. Use this edited configuration file for loading onto the new switch, and then enable SSH. |
| xos0066030 | L2PT is not working properly after path switchover in VPWS. |
| xos0066386 | The <code>show configuration</code> commands stops responding and produces an error when there is a loop in the network. |
| xos0066813 | Service VLAN ARP packets are lifted to the CPU during MPLS swap operation when service a VLAN is configured with the IP address of the provider switch. |
| xos0067138 | BFD is not working for IP static multicast route. |
| xos0063856 | On enabling SSH2, switch displays key generation time as approximately 15 minutes whereas it actually takes less than one minute. |

Table 15: Resolved Issues, Platform-Specific, and Feature Change Requests (CRs) in ExtremeXOS 16.2.3 (continued)

| CR Number | Description |
|--|--|
| xos0067328 | If you load a configuration file containing an SSH key length lesser than the actual key size stored in the switch EEPROM, the following message appears during bootup: "Enter passphrase:". |
| xos0063261 | Warning message to "restart process exsshd" should appear when configuring SSH2 key. |
| Summit X480 Series Switches | |
| xos0066630 | In Summit X480 stacking, the LED for stacking port 4 is not lit even when link is active. |
| Summit X670 Series Switches | |
| xos0066991 | In X670V-48T switches, combo ports link up with 100 Mbps speed, which is not supported. |
| BlackDiamond 8800 Series Switches | |
| xos0063558 | With 8900-XL modules acting as PE nodes, traffic destined to VPLS FDB entries is flooded periodically. |
| SummitStack | |
| xos0067253 | IPv4 packets ingressing a non-master stack node can be dropped when the port number of the destination's ARP entry is unknown, such as when the destination is using Network Load Balancing (NLB). |

Resolved Issues in ExtremeXOS 16.2.2-Patch1-3

The following issues were resolved in ExtremeXOS 16.2.2-Patch1-3. ExtremeXOS 16.2.2-Patch1-3 includes all fixes up to and including ExtremeXOS 11.6.5.3, and earlier, ExtremeXOS 12.0.5, ExtremeXOS 12.1.7, ExtremeXOS 12.2.2-patch1-12, ExtremeXOS 12.3.6, ExtremeXOS 12.4.5, ExtremeXOS 12.5.5, ExtremeXOS 12.6.3, ExtremeXOS 12.6.5, ExtremeXOS 12.7.1, ExtremeXOS 15.1.5, ExtremeXOS 15.2.4, ExtremeXOS 15.3.3, ExtremeXOS 15.4.1, ExtremeXOS 15.5.1, ExtremeXOS 15.5.2, ExtremeXOS 15.6.1, ExtremeXOS 15.6.2, ExtremeXOS 15.7.1, ExtremeXOS 16.1, ExtremeXOS 16.1.2, ExtremeXOS 16.1.3, ExtremeXOS 16.2, and ExtremeXOS 16.2.2. For information about those fixes, see the release notes for the specific release.

Table 16: Resolved Issues, Platform-Specific, and Feature Change Requests (CRs) in ExtremeXOS 16.2.2-Patch1-3

| CR Number | Description |
|----------------|---|
| General | |
| xos0064025 | Need to support Methode SP7051-EXT 10Gb-T RJ45 transceiver. |
| xos0064138 | Client identifier option length in DHCPv6 solicit packet is 16 instead of 14 with Link layer address padded with zeroes. |
| xos0064923 | When a remote loop is detected by ELRP (ingress and egress port of loop detection is the same) an excessive number of log messages occur. |
| xos0065654 | Etmon process ends unexpectedly with signal 10 when packet size in sampled packet is a negative integer. |

Table 16: Resolved Issues, Platform-Specific, and Feature Change Requests (CRs) in ExtremeXOS 16.2.2-Patch1-3 (continued)

| CR Number | Description |
|------------|---|
| xos0065830 | After port flaps, OSPF-learned routes are not present in kernel database. |
| xos0065987 | Service port FDB entries are learned on physical port of Network VLAN in provider switch. |
| xos0066231 | With default NetLogin configuration, extremeNetloginuser login and logout traps are not sent. |
| xos0066323 | When MLAG is configured with alternate path and ISC link goes down, a peer down log message is not generated. |
| xos0066325 | When MLAG is configured with alternate path and primary path goes down, SNMP trap for ExtremeMlagPeerDown object is not generated. |
| xos0066444 | Kernel error logs "Unable to copy IPMC index" appear in MLAG peers with PIM dense mode. |
| xos0066610 | Error "Cannot open Python script" appears after executing a Python script stored under a user-created subdirectory. |
| xos0066626 | Netlogin process crash ends unexpectedly while fetching the client details via SNMP MIB etsysMACAuthenticationMACSession and it happens only when there is MAC move observed for the clients. |
| xos0066758 | SSH login fails in first attempt, but succeeds in the second attempt, during RADIUS authentication even if credentials are valid. |
| xos0066759 | Switch stops to transmit CPU-generated packets when slow path forwarded packet rate is high. |
| xos0066770 | Memory leak occurs in aaa process when NetLogin dot1x client times out or authentication fails for the client. |
| xos0066804 | Routes learned from OSPF are lost after multiple port flaps occur. |
| xos0066806 | PIM checkpointing loop occurs between two switches that have two ISCs over two VRs. |
| xos0066874 | AAA process is leaking memory when dot1x clients are authenticating frequently. |
| xos0066895 | ELRP process ends unexpectedly when loop is detected in the switch. |
| xos0066982 | In Netlogin dot1x, RADIUS retries are not working properly. |
| xos0067076 | NetLogin process ends unexpectedly while fetching the client details using SNMP MIB etsysMACAuthenticationMACSession and it happens only when there is MAC move observed for the clients. |
| xos0060607 | Vulnerability CVE-2015 002 NTP leap second. |
| xos0061396 | OSPF accepts the policy name only with 31 characters even though the supported limit is 32 characters. |
| xos0066931 | Exsshd process consumes ~90% CPU when the command <code>clear session</code> is executed for the open SSH sessions. |
| xos0066489 | Loop occurs in ERPSv2 setup after rebooting one of the interconnecting nodes. |

Table 16: Resolved Issues, Platform-Specific, and Feature Change Requests (CRs) in ExtremeXOS 16.2.2-Patch1-3 (continued)

| CR Number | Description |
|------------------------------------|---|
| xos0066490 | ERPS in non-RPL nodes remains in pending state after rebooting interconnection node. |
| xos0051490 | External LSA generated by an ASBR in NSSA area contains wrong forwarding address. |
| xos0054972 | The output of the <code>debug hal show congestion</code> command displays the wrong CPU congestion counter values, which are much higher than the actual dropped packets. |
| xos0065490 | IGMP packets are forwarded over EAPS-blocked ports when PSTAG is configured on protected VLANs. |
| xos0065742 | SNMP traps are not generated for BGP state change events. |
| xos0066012 | ExtremeXOS MIBs have non-compilable errors. |
| xos0066476 | MPLS label TTL is not set properly for VPLS traffic in RSVP-TE. |
| xos0066518 | LLDP packets are reflected back to the sender without echo kill in PVLAN. |
| xos0066772 | Local multicast fast-path forwarding does not work for a few ports when IGMP filter is in per-VLAN mode. |
| xos0066891 | Packets are being forwarded without a tag after rebooting when PSTAG configured. This issue occurs when VLANs are configured with VID as "1". |
| xos0066926 | Errors occur when configuring OpenFlow in passive mode. |
| xos0066950 | Hash collision error messages may appear when there is contention for the L3 Hash table: <Warn:Kern.Ipv4Adj.Warning> vrlD 0 adj 0x00000002 Error finding adjacency when deleting hash collision. |
| xos0067048 | Multicast traffic doesn't get forwarded on PStag ports, when port is also added as part of another non PStag vlan |
| xos0066774 | IPv6 flow redirect is not working after slot is disabled and enabled back |
| xos0066410 | PSU odometer, temperature, and fan information are not updated periodically in the chassis-based switches. |
| xos0061317 | Switch reboots unexpectedly when enabling FIP snooping. |
| xos0057796 | Power is momentarily denied to PoE devices connected on ports, when a redundant PSU is inserted. |
| Summit X670 Series Switches | |
| xos0066406 | Scaled PStag configuration with non-PStag VLANs causes PStag error messages and installation of additional IPMC rules. |
| NWI Series Switches | |
| xos0066301 | Transceiver is not detected on NWI platforms. |
| Summit X460 Series Switches | |
| xos0065763 | Front panel port is not receiving any traffic over a period of time when devices are plugged in. |

Table 16: Resolved Issues, Platform-Specific, and Feature Change Requests (CRs) in ExtremeXOS 16.2.2-Patch1-3 (continued)

| CR Number | Description |
|--|--|
| BlackDiamond 8800 Series Switches | |
| xos0065366 | On BlackDiamond 8800 series switches, run diagnostics fails when it runs on both MSMs simultaneously. |
| SummitStack | |
| xos0065756 | In SummitStacks, alternate IP address is used for external communication even though a Management IP address is configured. |
| xos0066008 | Random slots or whole stack reboots when one of the standby nodes in the stack is power cycled with sys-recovery-level configured as "shutdown". |
| xos0066085 | Restart of some processes does not work properly when the standby slot has a lower license level. |
| xos0066104 | In SummitStacks, memory leak occurs in backup slot when configuring LLDP to advertise power-via-mdi with classification. |
| xos0066423 | In SummitStacks, with policy re-authentication and continuous MAC move scenarios, ACL delete requests are failing in backup node. |

Resolved Issues in ExtremeXOS 16.2.2

The following issues were resolved in ExtremeXOS 16.2.2. ExtremeXOS 16.2.2 includes all fixes up to and including ExtremeXOS 11.6.5.3, and earlier, ExtremeXOS 12.0.5, ExtremeXOS 12.1.7, ExtremeXOS 12.2.2-patch1-12, ExtremeXOS 12.3.6, ExtremeXOS 12.4.5, ExtremeXOS 12.5.5, ExtremeXOS 12.6.3, ExtremeXOS 12.6.5, ExtremeXOS 12.7.1, ExtremeXOS 15.1.5, ExtremeXOS 15.2.4, ExtremeXOS 15.3.3, ExtremeXOS 15.4.1, ExtremeXOS 15.5.1, ExtremeXOS 15.5.2, ExtremeXOS 15.6.1, ExtremeXOS 15.6.2, ExtremeXOS 15.7.1, ExtremeXOS 16.1, ExtremeXOS 16.1.2, ExtremeXOS 16.1.3, and ExtremeXOS 16.2. For information about those fixes, see the release notes for the specific release.

Table 17: Resolved Issues, Platform-Specific, and Feature Change Requests (CRs) in ExtremeXOS 16.2.2

| CR Number | Description |
|----------------|--|
| General | |
| xos0065519 | Loops may occur in network after the performing the following specific sequence: <ol style="list-style-type: none"> 1 Enable STP in any VLAN with specific set of ports. 2 Delete all ports from that VLAN. 3 Add same set of ports to another VLAN. 4 Enable EAPS/ESRP/STP protocol on this new VLAN. |
| xos0052432 | Need provision for advertising/receiving unique local IPv6 unicast address (ULA) using BGP protocol. |

Table 17: Resolved Issues, Platform-Specific, and Feature Change Requests (CRs) in ExtremeXOS 16.2.2 (continued)

| CR Number | Description |
|------------|--|
| xos0055511 | While configuring STP (802.1d) with port-encapsulation mode as EMISTP where the L2PT-enabled VMAN and access VLAN have the same tag, the designated bridge is not accepting the L2PT tunneled BPDUs from the root bridge, and thus causes a loop (designated bridge also becomes a root bridge). This problem does not occur: <ul style="list-style-type: none"> • When the access VLAN's tag and the L2PT-enabled VMAN's tag are different. • Without any L2PT configured, with the same tag used for the access VLAN and provider-edge VMAN. • When using Per-VLAN Spanning Tree Plus (PVST+), regardless of same or different tags. |
| xos0056389 | With Private VLAN, netlogin clients connected in isolated subscriber VLAN are not getting authenticated after disabling and enabling netlogging MAC. |
| xos0062037 | DHCP snooping entry gets programmed without client port number. |
| xos0062912 | SNMP trap sent for link up/down status change does not include port instance. |
| xos0063190 | Session timeout value is inappropriately overwriting the idle time-out value whenever both session timeout and idle timeout values are same, or the idle timeout value is 0. |
| xos0063194 | Dot1x authentication fails after rebooting the client when it is connected using an IP phone. |
| xos0063326 | Need to reduce the severity of "BGP resource full" message from Error to Info. |
| xos0063509 | Controlling trap behavior is not working in NetLogin. |
| xos0063551 | SNMP polling on CFM segment frame-delay statistics returns incorrect values. |
| xos0063837 | After deleting pstag port from a VLAN that has two LAG ports added as untagged, an error message appears. |
| xos0063995 | SNMP sysUpTime does not return correct value after failover. |
| xos0064023 | L3 table full log appears because of false resource full triggered by link flaps. |
| xos0064029 | Cannot delete prefixes for VLAN router advertisement messages after setting them. |
| xos0064094 | Removing subscriber VLAN from one PVLAN affects traffic in another PVLAN. |
| xos0064114 | SNMP process ends unexpectedly with signal 6 after running the switch for a long time. |
| xos0064170 | When ClearFlow is enabled with around 4,000 rules with separate counters, the HAL process utilization almost always stays at 40%. |
| xos0064220 | Calling-station-id attribute is missing in the RADIUS request for mgmt-access. |

Table 17: Resolved Issues, Platform-Specific, and Feature Change Requests (CRs) in ExtremeXOS 16.2.2 (continued)

| CR Number | Description |
|------------|---|
| xos0064281 | In Chalet, switch inappropriately displays logs for user accounts under enhanced security mode. |
| xos0064299 | The hal process ends unexpectedly after executing the command <code>debug packet capture on</code> . |
| xos0064436 | When adding ports to VLAN from Chalet, IP forwarding gets disabled for that VLAN. |
| xos0064459 | Nettools process ends unexpectedly with signal 11 when processing router advertisement packets with DNSSL option. |
| xos0064491 | The configuration of a disabled VLAN without any ports does not appear in the output of the <code>show configuration</code> command. |
| xos0064501 | Lacking forbidden VLAN concept in OnePolicy feature. |
| xos0064573 | ACL process ends unexpectedly after refreshing a policy with clear-flow rules. |
| xos0064706 | Cannot use SSH client after using "vi script.py" or "load script script". |
| xos0064707 | Error message from the <code>load script</code> command does not indicate that Python is a supported script language. |
| xos0064841 | LLDP stops advertising VLAN information on port after enabling LAG. |
| xos0064884 | "remove-private-AS-numbers" setting in BGP is not preserved after switch reboot. |
| xos0064889 | Layer 3 traffic through an MLAG peer in a failed state is not forwarded when there is a state change in the EAPS ring where this MLAG peer is a transit node. |
| xos0064904 | With a frequent re-authentication period set (≥ 30 seconds), NetLogin process leaks memory. |
| xos0064956 | EDP neighbors are not displayed when remote mirroring is disabled or after unconfiguring a monitor port of remote mirroring. |
| xos0064984 | Kernel oops occurs randomly when continuous SSH connection attempts are made to the switch. |
| xos0065056 | After applying meter to multiple VLANs, switch stops responding after executing <code>show access-list meter vlan</code> . |
| xos0065073 | Kernel oops observed when IPv6 duplicate address detected in the switch. |
| xos0065189 | BGP secondary best path is not active when primary best path goes down. |
| xos0065210 | With account lockout feature configured, an appropriate log message is not generated when users are locked out after three unsuccessful login attempts. |
| xos0065218 | DHCP binding restoration fails if the file name is configured with directory name. |
| xos0065313 | Need Idle-timeout feature added to Chalet. |

Table 17: Resolved Issues, Platform-Specific, and Feature Change Requests (CRs) in ExtremeXOS 16.2.2 (continued)

| CR Number | Description |
|------------|--|
| xos0065321 | With SSH session, source address information is not sent to TACACs accounting server. |
| xos0065393 | Memory leak occurs in HAL process after FDB entries age out. |
| xos0065479 | A CLI option is needed to save the state of whether or not the following traps are enabled for <code>cfgMgmtConfigChangeTrap</code> and <code>cfgMgmtSaveConfigTrap</code> . |
| xos0065525 | Need modifications in port ID TLV. Device ID TLV is sent in CDP messages. |
| xos0065552 | RADIUS-accounting request packet shows incorrect reason for client termination. |
| xos0065615 | Local multicast traffic is not egressing using a newly added member port in a LAG. |
| xos0065661 | IPMC error messages occur when multicast cache entries are created/ deleted for sub-VLAN, when sub-VLAN and super-VLAN belong to different virtual routers. |
| xos0065805 | Constant flush happens in ERPS non-revertive mode when the port being blocked is non-RPL |
| xos0065871 | LLDP process ends unexpectedly with signal 6 when doing SNMP walk for <code>lldpXMedLocLocationTable</code> . |
| xos0065897 | When continuous SSH attempts are made to a switch, <code>exsshd</code> process ends unexpectedly with signal 6. |
| xos0065943 | SNMP walk for <code>extremePortUtilizationTable</code> returns integer value, but CLI output returns decimal value. |
| xos0066060 | OpenFlow error message appears when rule is not getting installed in hardware and same flow is received immediately for another installation. |
| xos0066156 | Switch reboots unexpectedly due to memory leak in <code>dot1ag</code> process. |
| xos0066345 | XMLC process ends unexpectedly with signal 6 when sending XML notification to Ridgeline server. |
| xos0061169 | Need an option to use hostname while uploading log using command <code>upload log</code> . |
| xos0063158 | HAL.VLAN error message occurs when enabling/disabling OpenFlow. |
| xos0064393 | Traffic is not forwarded to VPLS peer after disabling sharing on service port when both untagged VMAN and tagged VLAN are configured on the same port. |
| xos0066367 | Need to have a "clear" command to change ERPS ring state from "pending" to "idle" state. |
| xos0066398 | COA disconnects are incorrectly logged as idle timeouts in EMS. |
| xos0054151 | DHCP server configuration is lost after reboot when IP DAD is on. |
| xos0062722 | NetLogin does not work after a port moved to translation VLAN expires. |

Table 17: Resolved Issues, Platform-Specific, and Feature Change Requests (CRs) in ExtremeXOS 16.2.2 (continued)

| CR Number | Description |
|------------|--|
| xos0063424 | Source MAC address is learned on the incorrect VLAN for double-tagged packets with inner VLAN ID that is the same as the VPLS service VLAN ID. |
| xos0063959 | BGP routes become unfeasible when default routes are advertised through OSPF or BGP. |
| xos0064216 | Unable to ping a destination which is reachable, if the destination is also present locally but disabled. |
| xos0064523 | Dynamic ACL rule is not removed properly when turning off packet capture. |
| xos0064525 | Policy does not allow regular expression to be specified for BGP communities. |
| xos0064874 | Tagged frames should be processed for authentication with NetLogin and policy enabled. |
| xos0064909 | Traffic loss occurs while changing and reverting the base VID of VLANs with PStag ports. |
| xos0064910 | The following error message appears when changing tag value in VLANs with port-specific tag configured ports: <pre>"<Error:Kern.MPLS.Error> MPLS bcm_esw_mpls_port_match_vlan_del failed"</pre> |
| xos0064960 | Multicast traffic is forwarded through MVR receiver port in a VLAN even if there is no active receiver. |
| xos0065109 | Packets with DMAC as multicast MAC and DIP as unicast IP are software forwarded when IGMP filter mode is per-VLAN. |
| xos0065110 | Creating one VLAN starting with "vr" causes the <code>show iproute vr vr-mgmt</code> command to not recognize "vr-mgmt" in the syntax. |
| xos0065120 | Configuring port display-string with special characters causes page loading issues on Chalet. |
| xos0065197 | Rtmgr process ends unexpectedly with signal 11 after issuing <code>restart ports all</code> command in peer switch with BGP enabled. |
| xos0065215 | Slow xmld process memory leak occurs when EPIC center polling the switch. |
| xos0065301 | FDB entries are not programmed in the hardware as programmed in the software. |
| xos0065344 | The output of the <code>show vid</code> command shows flag status incorrectly. |
| xos0065372 | MPLS error messages are seen when disable/enable network vlan. |

Table 17: Resolved Issues, Platform-Specific, and Feature Change Requests (CRs) in ExtremeXOS 16.2.2 (continued)

| CR Number | Description |
|------------|--|
| xos0065648 | When a MAC address moves from a NetLogin-enabled port (mac-vlan mode) to a non-NetLogin-enabled port, the VLAN_MAC table can become full resulting in the following message: <pre><Warn:HAL.FDB.MacVlanAddFail> MAC-based VLAN entry 78:7E:61:A1:DC:DC vlan 2600 addition to port 22 failed, Table full</pre> |
| xos0065977 | Random Nettools process crash observed with signal 5, when router discovery and DNS is enabled. |
| xos0064423 | In BlackDiamond 8800 and X8 series switches, flooding to a VPLS peer does not work after adding a new port to an existing LAG group. |
| xos0060184 | After configuring MVRP registration forbidden, the command is accepted and registration is forbidden. However, the show configuration mrp command does not display this configuration and this configuration is not retained after a reboot. |
| xos0061948 | VLAN statistics not working after modifying the shared group. |
| xos0064735 | VMAN CEP configuration gets removed from hardware while removing member port from LAG. |
| xos0065159 | OpenFlow process ends unexpectedly with signal 11 when OpenFlow controller installs LLDP flow. |
| xos0065291 | One-to-many mirroring is not working. |
| xos0065292 | Traffic is not forwarded from member VLAN to untagged ports in translation VLAN. |
| xos0065322 | IPv6 neighbor-discovery max_pending_entries configuration for USER-VR does not appear in output of show configuration command and is lost after reboot. |
| xos0055519 | Error message is reported when configuring OpenFlow controller with hostname instead of IP address. |
| xos0062835 | Upload log command times out when the memory-buffer size is >= 18000. |
| xos0060461 | Need command option for iBGP and eBGP protocols under the configure iproute ipv6 priority command. |
| xos0063960 | Several help options do not appear for the show fdb command. |
| xos0065104 | FDB is not removed from software after ageing period. |
| xos0065845 | Traffic drops between the CVID configured ports in the VPLS service VMAN when CEP egress filtering is enabled. |
| xos0066140 | RSTP BPDU is not transmitted even though STP state is in forwarding mode when loop-protect is enabled. |
| xos0064568 | After slot reboot, traffic drop occurs on VPLS service VLAN LAG port. |
| xos0065542 | Kernel crash occurs when rebooting the switch with a physical loop. |

Table 17: Resolved Issues, Platform-Specific, and Feature Change Requests (CRs) in ExtremeXOS 16.2.2 (continued)

| CR Number | Description |
|--|---|
| xos0065261 | Traffic loss occurs in one VLAN when another VLAN with a loop causes significant congestion. |
| xos0061359 | Policy has no PVID after unconfiguring the switch. |
| xos0063806 | After establishing SSH session with switch for some time, SSH login fails and the command <code>show management</code> becomes unresponsive. |
| xos0065712 | When repeated login and logout is performed using SSH-PKI (SSH login using certificates) for about two days from eight terminals, memory leak occurs. |
| xos0066004 | When using the same debug password on different Telnet sessions of same switch, cliMaster process ends unexpectedly. |
| xos0065896 | Need addition of capability flags in <code>show cdp neighbor</code> command output. |
| xos0065010 | Process aaa ends unexpectedly when receiving RADIUS frame with errors. |
| xos0066059 | CLI cursor jumping when word wrapping when using SSH session. |
| xos0059489 | ERPS process ends unexpectedly when ERPS tries to send hello packet during reboot. |
| BlackDiamond 8800 Series Switches | |
| xos0065735 | BlackDiamond 8500-MSM24 modules are not supported beyond the ExtremeXOS 15.6 release, but installation of for unsupported ExtremeXOS releases is not blocked. |
| xos0066143 | IGMP snooping per-VLAN mode causes additional slice utilization in G48Te2 modules. |
| xos0065776 | In BlackDiamond 8800 c-series modules, VRRP gateway is not reachable after reboot. |
| SummitStack | |
| xos0064859 | In SummitStack, gPTP process ends unexpectedly during bootup if AVB license was enabled on any of the stack nodes. |
| xos0064758 | In SummitStacks, when doing SNMP walk for LLDP MIB, port number does not represent the ifIndex or dot1dBasePort number. |
| xos0065115 | In a stack with a backup, configuring a RADIUS(or RADIUS-accounting) server (primary or secondary) using a hostname causes the backup to reset when trying to resolve the hostname using DNS. |
| xos0065157 | In SummitStacks with remote mirroring configurations, the remote-tag is not added for software-forwarded packets. |
| xos0066331 | Layer 3 traffic is not forwarded after multiple stack failovers. |
| xos0064575 | "Operation draining timed out" error message appears while saving the configuration in stacking switch. |

Table 17: Resolved Issues, Platform-Specific, and Feature Change Requests (CRs) in ExtremeXOS 16.2.2 (continued)

| CR Number | Description |
|---------------------------------------|---|
| xos0065088 | With broadcast traffic flooded across the slots, the standby node stays in rebooting state after consecutive master failovers by cycling the power off, and then on. |
| xos0065308 | Kernel crash occurs when unconfiguring switch with maximum ACL rules. |
| xos0065387 | SNMP times out while when saving on an eight-node stack of Summit X440 series switches. |
| xos0064471 | Stacking ports flapped continuously after failover in presence of bi-directional known unicast traffic. |
| xos0066029 | In Summit X460-G2 stacks, LACP keeps flapping due to forwarding one LACP PDU to another group. |
| xos0065150 | When LAG ports are added to VPLS, LACP flap occurs after rebooting the slots in the stack. |
| Summit X440 Series Switches | |
| xos0064196 | Error log message "could not clear eee stats" appears after issuing <code>clear counters</code> command. |
| Summit X460 Series Switches | |
| xos0064005 | When two Summit X460 series switches are stacked with only one alternative stack port, traffic across slots does not work if the second stack port is configured as native. |
| Summit X670 Series Switches | |
| xos0064855 | On Summit X670-48X switches, some ports do not become active when using 5 M SFP+ passive copper cable connected to Summit X450-G2 series switches. |
| Summit X460-G2 Series Switches | |
| xos0064684 | On Summit X460-G2 series switches, ESVT test does not start if the loopback port used is a 10G port. |

Resolved Issues in ExtremeXOS 16.2

The following issues were resolved in ExtremeXOS 16.2. ExtremeXOS 16.2 includes all fixes up to and including ExtremeXOS 11.6.5.3, and earlier, ExtremeXOS 12.0.5, ExtremeXOS 12.1.7, ExtremeXOS 12.2.2-patch1-12, ExtremeXOS 12.3.6, ExtremeXOS 12.4.5, ExtremeXOS 12.5.5, ExtremeXOS 12.6.3, ExtremeXOS 12.6.5, ExtremeXOS 12.7.1, ExtremeXOS 15.1.5, ExtremeXOS 15.2.4, ExtremeXOS 15.3.3, ExtremeXOS 15.4.1, ExtremeXOS 15.5.1, ExtremeXOS 15.5.2, ExtremeXOS 15.6.1, ExtremeXOS 15.6.2, ExtremeXOS 15.7.1, ExtremeXOS 16.1, ExtremeXOS 16.1.2, and ExtremeXOS 16.1.3. For information about those fixes, see the release notes for the specific release.

Table 18: Resolved Issues, Platform-Specific, and Feature Change Requests (CRs) in ExtremeXOS 16.2

| CR Number | Description |
|------------------------------------|---|
| xos0064215 | The following log message appears when a subnet is reachable both using MPLS and non-MPLS: <Warn:Kern.IPv4FIB.Warning> Slot-4: dest 0x0A420000 / 24 nexthop 0xAC11121E: Unable to add route to unit 1, rc Entry not found. Shadow problem. |
| Summit X430 Series Switches | |
| xos0059486 | On Summit X430 series switches, optics are not detected after repeated removal and reinsertion of optics when CPU is busy. |
| xos0064084 | In Summit X430 series switches, the command <code>show power details</code> displays fan status as "empty". |
| Summit Series Switches | |
| xos0059007 | QSFP+ to SFP+ adapter support is added to work with all optical SFP+ transceivers with the exception of LRM and passive copper direct attach cables. |
| xos0059484 | Gigabit Ethernet compliance value is shown as "UNKNOWN" for BXU/D optics. Also, DDMI values do not appear. Media Type appears as "NONE" in <code>show ports configuration</code> command. |
| xos0059508 | Link does not come up when 1G BX U/D optics are inserted into 10G SFP+ ports. Note: Configure the port for speed 1,000 with auto-negotiation "on" using the command <code>configure port <> auto on speed 1000 duplex full</code> . For Summit X670V switches, remove and then re-insert the optics. For all Summit switches, except the X670V, the corrected behavior persists even after rebooting. For Summit X670V switches after rebooting, the transceiver must be removed, and then re-inserted. |
| xos0062570 | In SummitStacks, executing the command <code>enable sflow ports</code> all enables sFlow inappropriately on stacking ports. |
| xos0062821 | ACL rules installed are not mapped to single virtual group even though ACL action-resolution mode is highest-priority. |
| Summit X440 Series Switches | |
| xos0060466 | RX CRC errors with traffic loss occur when "CBL, SFPP, PASSIVE 10GB-C10-SFPP, 10M" from Tyco is inserted into Summit X440-48t-10G switches SFP+. |
| xos0062362 | On Summit X440-24t series switches, process <code>rtmgr pid 1572</code> ends unexpectedly with signal 11 error after disabling BGP with compressed routes. |
| xos0062621 | On Summit 440-8p switches, the <code>show fan</code> command output displays that the fan is unsupported. |
| xos0063627 | ARP is not re-added to hardware after it is removed initially due to the table being full. |

Table 18: Resolved Issues, Platform-Specific, and Feature Change Requests (CRs) in ExtremeXOS 16.2 (continued)

| CR Number | Description |
|---------------------------------------|--|
| xos0064050 | While running diagnostics on a Summit X440 10G model switch with revision 10 and diagnostics test version 6.0 or above, "Test loopback phy fiber" and "Test snake interface" fail. |
| Summit X440-G2 Series Switches | |
| xos0063317 | When policy is enabled one less than the max number of netlogin users can be handled per slot. |
| xos0062775 | With 32 Up MEPs configured, saving and rebooting produces the following errors: <pre> 10/03/2015 18:14:06.81 <Noti:EPM.system_stable> System is stable. Change to warm reset mode 10/03/2015 18:14:10.06 <Info:HAL.IPv4ACL.Info> Synching ACLs to Switch 10/03/2015 18:14:10.35 <Info:HAL.IPv4ACL.Info> Done synching ACLs to Switch 10/03/2015 18:15:11.73 <Erro:HAL.FDB.Error> pibInstallCPUFilter(1:33, 12, 33) - pibAclWrapInstall(1, 2, 1020, 5242950) returned "Table full". 10/03/2015 18:15:11.77 <Erro:HAL.FDB.Error> pibInstallCPUFilter(1:33, 13, 33) - pibAclWrapInstall(1, 2, 1021, 5242950) returned "Table full". 10/03/2015 18:15:13.26 <Erro:HAL.FDB.Error> pibInstallCPUFilter(1:5, 12, 33) - pibAclWrapInstall(1, 1, 1028, 5242950) returned "Table full". 10/03/2015 18:15:13.30 <Erro:HAL.FDB.Error> pibInstallCPUFilter(1:5, 13, 33) - pibAclWrapInstall(1, 1, 1029, 5242950) returned "Table full". 10/03/2015 18:15:15.47 <Info:HAL.Card.Info> Switch is operational </pre> |
| Summit X450-G2 Series Switches | |
| xos0060129 | On Summit X450-G2 series switches, 10/100/1000BASE-T SFP+ optics do not link to similar optics when in the SFP/SFP+ ports. They do link or partially link when connected to a regular triple speed copper port. |
| Summit X460 Series Switches | |
| xos0063206 | Cannot add L2 entries in hardware due to a full L2 table caused by hash collisions. |
| xos0063595 | On Summit X460 series switches, the command to configure stacking ports does not show the native option. |
| xos0063948 | Clearflow delta values are randomly not calculated properly. |
| Summit X460-G2 Series Switches | |

Table 18: Resolved Issues, Platform-Specific, and Feature Change Requests (CRs) in ExtremeXOS 16.2 (continued)

| CR Number | Description |
|------------------------------------|---|
| xos0060018 | With a 0.5M, 40G QSFP MOLEX passive copper cable inserted, disabling the port where the optic is inserted, rebooting, and then enabling the port, the port stays in the ready state and doesn't come up as enabled. Note: Remove and re-insert the optics. The port then comes up as enabled. |
| xos0061486 | Combo ports have unsupported autonegotiation and half-duplex settings. |
| xos0062855 | On the Summit X460-G2 series switches, VPLS packets are forwarded with two tags when the service VLAN ports are also members of an untagged VMAN. |
| xos0062913 | On Summit X460-G2 series switches, copper combo port does not advertise its flow control capabilities to peers. |
| xos0063495 | Policy authentication fails when RADIUS request queue has stale entries. |
| xos0063811 | Summit X460-G2 series switches with ExtremeXOS 15.6 through 21.1, have the following limitations for SyncE input reference frequency: <ul style="list-style-type: none"> Network clock does not lock with input SyncE source port 52 (both at 10G and 1G speed) on all 48-port models (X460-G2-48t, 48x and 48p). <p>Note: For SyncE input at 10G, avoid port 52.</p> <ul style="list-style-type: none"> When the 10G ports operate at 1G speed, the network clock does not lock. Models with Ethernet BASE-T or Power over Ethernet (PoE) ports may lock on initial configuration, but do not lock after a save and reboot. <p>Note: For SyncE input at 1G, use a 1G port, not a 10G port.</p> |
| Summit X480 Series Switches | |
| xos0054290 | When a semicolon is missing from ACL matching criteria, the ACL process ends unexpectedly. |
| xos0060614 | When exporting OSPF routes into BGP, and long policy name causes process dcbgp pid 1575 to end unexpectedly with signal 11. |
| xos0061251 | For Summit X480, X460, X440, X430 series switches, and E4G-200 and E4G-400 cell site routers, Dot1p examination functionality does not work correctly for untagged ports when diffserv examination is enabled on those ports. |
| Summit X670 Series Switches | |

Table 18: Resolved Issues, Platform-Specific, and Feature Change Requests (CRs) in ExtremeXOS 16.2 (continued)

| CR Number | Description |
|---------------------------------------|---|
| xos0060656 | Link does not come up when 1G BX U/D optics are inserted into 10G SFP+ ports. Note: Configure the port for speed 1,000 with auto-negotiation "on" using the command <code>configure port <> auto on speed 1000 duplex full</code> . For Summit X670V switches, remove and then re-insert the optics. For all Summit switches, except the X670V, the corrected behavior persists even after rebooting. For Summit X670V switches after rebooting, the transceiver must be removed, and then re-inserted. |
| xos0061167 | Links become active without a connection with tri-speed Base-T SFP installed. |
| xos0061559 | Enabling OpenFlow on VLANs causes double-wide ACL slice to be used even though it can fit in single-wide slice. |
| xos0063052 | Traffic loss occurs on computer connected to Summit X670v-48t switches when the connected switch port is oversubscribed in 100 MB mode. |
| xos0063137 | Known unicast traffic is not shared between the stacking high-gig trunk ports. |
| Summit X670-G2 Series Switches | |
| xos0061791 | On SummitStacks containing master and standby nodes of different switches, the standby node may go to failed state after a node reboot. |
| xos0062166 | On Summit X670-G2 series switches configured with L3VPN, executing the <code>clear iparp</code> command causes the switch to reboot with Kernel Oops. |
| xos0063204 | Traffic stops on LAG ports when frequently modifying the sharing group. |
| xos0063807 | On Summit X670-G2 series switches, egress ACL rule actions do not take effect on ports 64-72. |
| Summit X770 Series Switches | |
| xos0053867 | Internal errors occur when looking at egress port qosmonitor after issuing any QoS command such as: <code>enable diffser examination port all,enable diffser replacement port all,disable diffser examine port all,or disable diffser replacement port all</code> : <pre>Slot-1 Stack.34 # sh port 1:93 2:73 qosmonitor Error: Internal error --> no response to stats request for port 1:93.</pre> |
| SummitStack | |
| xos0061799 | Precedence order between policy port rules and policy MAC-based rules is not preserved following a master/backup Failover. |
| xos0062217 | In SummitStacks with eight nodes and sFlow configuration, "Hardware L3 Table full" error messages appear when the stacks have a large number of Layer 3 entries. |

Table 18: Resolved Issues, Platform-Specific, and Feature Change Requests (CRs) in ExtremeXOS 16.2 (continued)

| CR Number | Description |
|--|---|
| xos0062700 | When upgrading from ExtremeXOS 15.7 or earlier to 16.1, image download fails if image was installed in backup node first and master node second. |
| xos0062949 | HAL process ends unexpectedly in stack after executing the following commands: <code>debug hal configure stacking pdu-trace mask 0xf,debug hal configure stacking pdu-trace capture cap_file</code> |
| xos0063344 | With MLAG and LAG configurations, when a stack node comes up after a reboot, FDB entries flooded from other slots are programmed on incorrect ports internally. |
| xos0061777 | Standby nodes do not come back up to operational state after they go into failed state. |
| xos0062367 | ACL process ends unexpectedly on repeated refresh of ACL policy with clear-flow action. |
| xos0062522 | In SummitStack switches, standby slots go to failed state when a very large number of log messages are continuously generated in the switch. |
| xos0062800 | Stack node fails because of license mismatch for 3rd-party optics. |
| xos0063242 | Stacks configured as DHCP clients do not respond to pinging after failover. |
| xos0063490 | CFM stays down after slot reboot on a stack. |
| xos0063349 | Switch stops responding to SNMP requests if SNMP get for multiple OIDs is continuously initiated. |
| BlackDiamond 8800 Series Switches | |
| xos0063333 | In BlackDiamond 8800 series switches, optics information is not detected and ports remain in "Ready" state after reboot. |
| xos0063510 | ACL rule to deny packets matching L4 match condition stops working if a rule with VID as match condition is appended without an L4 match condition. |
| xos0057419 | On BlackDiamond 8800 series switches, C-series modules reboot after enabling dot1p replacement on ports. |
| xos0061260 | When learning a large number of BGP routes, routes are learned first in route table, rather than LOCAL-RIB. No routes are learned to RIB until all routes are learned in route table. All prefixes are learned in route table, and only then are all prefixes are learned to LOCAL RIB. |
| xos0062009 | In BlackDiamond 8800 series switches with XL modules, clearing FDBs when there is a loop causes the FDBs to lose synchronization across slots or switching units. |
| xos0062535 | On BlackDiamond 8900-10G24Xc I/O modules, packets are dropped by ACL rules with "redirect-port-list" action. |
| xos0063872 | After multiple executions of <code>run failover</code> with redirect-flow configuration, IPv4 ping fails. |

Table 18: Resolved Issues, Platform-Specific, and Feature Change Requests (CRs) in ExtremeXOS 16.2 (continued)

| CR Number | Description |
|--|--|
| xos0063532 | IGMP report packets are not processed when received on VMAN CEP port. |
| BlackDiamond X8 Series Switches | |
| xos0060666 | After failover, traffic gets flooded on the ports of service VLAN in H-VPLS core. |
| xos0061639 | Packets ingressing on VLAN-bridged interfaces (Layer 2 VLANs) are not forwarded when the destination MAC address is the same as the switch MAC address, and the switch has at least one Layer 3 interface. |
| xos0061902 | BlackDiamond X8 series switches use VLAN instance as index instead of router interface (rtif) for ARP entries. |
| xos0062200 | BGP is not converging when there is change in network in scaling environment. When the best path goes down, BGP RIB converges. but route table is still showing old peer as gateway. |
| xos0062262 | UDP profile configurations on VLANs do not take effect in BlackDiamond X8 series switches. |
| xos0062306 | Packets get reflected with same tag on port-specific, tag-enabled VLANs after failover. Issue happens only on switches having both port-specific tags and MPLS RSVP-TE configurations. |
| xos0062477 | BlackDiamond X8 series switches' management ports flap and show "Detected Tx unit hung" error messages. |
| xos0062499 | Multicast packets are dropped in Layer 2 bridged VLANs. |
| xos0063546 | The following error message may appear when BlackDiamond X8 modules are rebooted after configuring port partition: <pre><Error:Kern.Card.Error> Slot-2: _setSchedMode: u:p=1:006 schedMode=1 err=Invalid parameter</pre> |
| xos0063928 | In BlackDiamond X8 series switches, Sysuptime in sFlow packets is invalid. |
| xos0063958 | BDX8-40G12X-XL module goes into reboot cycle if any physical loop is configured or a network loop is present on the module. |
| xos0064010 | The command <code>show port buffer</code> displays an incorrect port range for 100G I/O modules. |
| General | |
| xos0063554 | The following vulnerability in OpenSSL exists that impacts ExtremeXOS (CVE-2015-3197): A malicious client can negotiate SSLv2 ciphers that have been disabled on the server and complete SSLv2 handshakes even if all SSLv2 ciphers have been disabled, provided that the SSLv2 protocol was not also disabled via <code>SSL_OP_NO_SSLv2</code> . This issue affects OpenSSL versions 1.0.2 and 1.0.1. |
| xos0061745 | Ampersand used in UPM script is replaced by "& amp" in the XSF configuration. |
| xos0061841 | FDB entries are not learned again after limit learning is unconfigured, and then configured again, with PSTAG configuration in SummitStacks. |

Table 18: Resolved Issues, Platform-Specific, and Feature Change Requests (CRs) in ExtremeXOS 16.2 (continued)

| CR Number | Description |
|------------|---|
| xos0061943 | MPLS process ends unexpectedly when get-next is done with incomplete OID for mplsXCIndex. |
| xos0062850 | When upgrading ExtremeXOS to 15.7 or later releases, the web HTTP access is enabled even though it is disabled in the configuration. |
| xos0063028 | RADIUS configuration with shared-secret of 32 character is lost after reboot. |
| xos0063248 | NTP MD5 authentication with NTP server is failing. |
| xos0063257 | Saving configuration fails/times-out when VLANs added to a mirror filters are renamed. |
| xos0063271 | Layer 3 packets in non-default virtual routers are slow-path forwarded after disabling MPLS in the peer switch. |
| xos0062255 | CEP CVID configurations is missing after adding/deleting the port from sharing. |
| xos0062720 | Unable to save configuration when ACL/CFM is configured on multiple VLANs. |
| xos0057931 | After rebooting the switch multiple times, the following error log message appears: <pre><Errno:cm.loadErr> Failed to load configuration: timed out (after 150 seconds) while waiting for all applications to get ready to load configuration on OPERATIONAL (eaps is still not ready yet).</pre> |
| xos0061788 | The process devmgr ends unexpectedly during snmpwalk when continuous EMS logs are sent to the switch console. |
| xos0062271 | CLI memory leak occurs when executing show commands with include option through script. |
| xos0064043 | Unable to use a configuration file that has been copied from an existing configuration file. |
| xos0064179 | MAC movement occurs in switch acting as an STP root bridge when PVST+ BPDUs are sent by peer switch using STP blocked port. |
| xos0062366 | After rebooting, DHCP binding entries are not restored using vr-default. |
| xos0057231 | An FDB entry created by ARP with "i" flag set is not removed from the FDB table after a static entry for the same IP address is added with a different MAC value. |
| xos0063521 | A few IBGP routes are not updated in routing table when disable bgp and enable bgp commands are executed in quick succession. |
| xos0064203 | Incorrect next hop is chosen by BGP route after port flap. |
| xos0062441 | The process rtMgr ends unexpectedly when IPv6 static route is deleted. |

Table 18: Resolved Issues, Platform-Specific, and Feature Change Requests (CRs) in ExtremeXOS 16.2 (continued)

| CR Number | Description |
|------------|---|
| xos0060319 | Trying to create the maximum number of Layer 3 VLANs causes the following error messages to appear: <pre>02/20/2015 11:37:34.18 <Erro:HAL.VLAN.Error> MSM-A: pibVlanInstallBatchFilter(): Internal error while translating IPv6MC Ctrl Port filter id on Slot 2, unit 13. 02/20/2015 11:37:34.18 <Erro:HAL.VLAN.Error> MSM-A: Failed to install IPV6 Link-Local MC Control Packet Filter for the port 2:24 (Conduit failure) 02/20/2015 11:37:34.18 <Erro:HAL.VLAN.Error> MSM-A: pibVlanInstallBatchFilter(): Internal error while translating IPv6MC Ctrl Port filter id on Slot 2, unit 13. 02/20/2015 11:37:34.18 <Erro:HAL.VLAN.Error> MSM-A: Failed to install IPV6 Link-Local MC Control Packet Filter for the port 2:48 (Conduit failure)</pre> |
| xos0062265 | Some legacy commands are not recognized. |
| xos0062277 | The command <code>show vlan vlan_list</code> does not show information for dynamic VLANs nor the Default VLAN. Error appears. |
| xos0062427 | EDP process ends unexpectedly when CDP packets without portId TLV are received. |
| xos0058750 | Neighbor discovery packets are duplicated in L2 VLANs when IPv6 addresses are configured for other VLANs that do not have any ports. |
| xos0062240 | Port that was administratively disabled becomes up after enabling rx pause. |
| xos0061506 | In Summit X440-G2 and X460-G2 series switches, the combo port comes up as active even though when link peer port is down. |
| xos0063255 | In Chalet, VLANs are sorted incorrectly.. |
| xos0064447 | Creation of user accounts through XML does not work. |
| AAA | |
| xos0064307 | RADIUS accounting configuration is incorrect as shown by the command <code>show conf aaa</code> and is lost after upgrade. |
| ACL | |
| xos0062537 | HAL crash occurs when redirect-port-list action contains more than 64 ports. |
| xos0062619 | SSH access-profile using policy does not work with IPv6 addresses. |
| xos0063082 | Updated DSCP value is not refreshed for Dynamic ACLs. |
| xos0063172 | ACL action "redirect-port-list" does not take effect when another slice has a rule to match all packets with deny action. |
| xos0063240 | ACL process ends unexpectedly when switch has clear-flow ACL rule with count interval greater than snmptrap generation timer. |
| xos0064054 | SNMPwalk on extremeAclStatsTable returns value with port instance instead of ifIndex. |

Table 18: Resolved Issues, Platform-Specific, and Feature Change Requests (CRs) in ExtremeXOS 16.2 (continued)

| CR Number | Description |
|------------|--|
| xos0064223 | Need to add an ACL match condition for matching next-hop addresses during the look-up cycle of a packet, so that actions can be taken based on the next-hop a packet is destined for. |
| xos0064490 | After upgrading from ExtremeXOS 15.2 to later release, last installed dynamic ACL rule is given more priority than previously installed rules. |
| xos0062145 | With QoS configuration, ACL process signal 11 ends unexpectedly after rebooting. |
| xos0063547 | Process ACL ends unexpectedly after applying a policy file with source zone as a match condition. |
| xos0064129 | Policy refresh never completes with network-zone configuration. |
| AVB | |
| xos0062494 | Source MAC addresses learned through MVRP packets on a blocked port (STP) cause traffic to be dropped. |
| BGP | |
| xos0055051 | When applying an import policy to BGP, cost configured in the policy is not applied to route tables. This issue is not resolved after multiple policy refreshes nor after multiple disabling, and then enabling BGP. |
| xos0058441 | After creating a BGP peering session between link local IPv6 addresses with the scope ID specified, deleting the VLAN containing link local IPv6 address, and then issuing the command <code>show configuration bgp</code> , switch reboots with “ Epm application wdg timer warning ” error message. |
| xos0061129 | In a multi-peer setup with many routes (over 150K), a few routes from the preferred peer do not become active in the BGP RIB. Disabling, and then re-enabling peer, restores all routes. |
| xos0061411 | Route table installs sub-optimal BGP routes (next-hop) to kernel, while the BGP RIB shows different paths when same routes are received from two different peers in local-RIB Note: Disable, and then enable peer or disable, and then enable BGP. |
| xos0061505 | After a topology change in the network, BGP routes requiring two levels of recursive lookup are programmed in hardware with incorrect next hops. |
| xos0063173 | Process dcbgp ends unexpectedly with signal 11 after issuing the command <code>show bgp neighbor</code> . |
| xos0064319 | Aggregated BGP route is not transmitted to upstream neighbor when highest prefix route is received from neighbor. |
| xos0064589 | While learning BGP routes, some routes are not getting installed in route table when deleting and re-adding the static route. |
| xos0062260 | BGP process ends unexpectedly when local address or password is changed for BGP neighbor, and then you immediately execute a BGP show/configuration command. |

Table 18: Resolved Issues, Platform-Specific, and Feature Change Requests (CRs) in ExtremeXOS 16.2 (continued)

| CR Number | Description |
|-------------------|--|
| xos0064496 | BGP route policy performs improper community delete operation. |
| CFM | |
| xos0063506 | Traceroute MAC address in CFM domain does not return information about destination switch. |
| ClearFlow | |
| xos0062629 | Clearflow rule does not work properly if there is dot(.) in the ACL counter. |
| Clocking | |
| xos0063370 | PTP Delay Response correction field contains high value (random value) when PTP Delay response packets are passing through combo ports. |
| xos0062504 | You can set a GPTP "peer delay current interval" outside of the correct range of -3 to 17.. |
| Devices | |
| xos0063429 | The output of the command show fan shows the fan status as empty after a hot re-seating of the fan module. |
| xos0062879 | Transceiver information shows same Rx power value for 4x10G partition ports even though some ports are in ready state. |
| xos0064075 | The output of the show fan command shows fan status as "Failed" after hot re-seating a fan module. |
| DHCP/BOOTP | |
| xos0058668 | After rebooting DHCPv6, client remains in rebooting state. |
| xos0058669 | DHCPv6 client: After changing the client identifier type, and then restarting the port, old IPv6 addresses are not released, causing the show vlan command to show multiple IPv6 addresses. |
| xos0061219 | Parallel-mode-enabled DHCP offer is sent using primary IPv4 address to the client for multiple offers received from server for different IPv4 addresses. |
| xos0062017 | DHCP trusted port configuration is lost after disabling, and then re-enabling LAG. |
| xos0064151 | Error occurs when removing DHCP configuration from VLANs when LAG ports are added to the VLANs. |
| EAPS | |
| xos0063282 | ExtremeXOS CLI restricts PVLAN subscriber VLAN from being configured as an EAPS-protected VLAN. |
| EDP | |
| xos0062472 | Source MAC addresses learned through CDP packets received on EAPS-blocked ports cause traffic to be dropped. |
| ELRP | |

Table 18: Resolved Issues, Platform-Specific, and Feature Change Requests (CRs) in ExtremeXOS 16.2 (continued)

| CR Number | Description |
|----------------------------|--|
| xos0062460 | The <code>show configuration</code> command output shows incorrect ELRP configuration. |
| xos0062618 | ELRP forgets the disabled port information if the port is deleted from another VLAN that also has ELRP enabled. As a result, the disabled port stays disabled unless manually enabled. |
| EMS | |
| xos0063736 | In Syslog, username information appears as "*****" during login/logout cases. |
| ESRP | |
| xos0061965 | Configuring ESRP member VLANs (VRRP-enabled) produces errors. |
| FDB | |
| xos0062789 | Disabling learning on LAG ports does not flush FDB entries. |
| xos0063368 | In an MLAG configured switch, FDBs are not installed in hardware after reboot if there are frequent MACMoves between MLAG port and ISC. |
| xos0059481 | Static FDB is programmed incorrectly in hardware after a stack failover. |
| Identity Management | |
| xos0061781 | Identity manager entries become stale when clients are moved from one port to another in sub-VLANs. |
| IGMP | |
| xos0062914 | The process mcmgr ends unexpectedly after receiving corrupted IGMPv3 join packets on MLAG ports. |
| ISIS | |
| xos0063423 | Memory leak occurs in ISIS process when exporting OSPF routes to ISIS. |
| Layer 2 | |
| xos0064682 | Enabling egress VMAN CEP filtering on a CEP port sends a tagged packet, even though it should be forwarded as untagged. |
| Layer 3 | |
| xos0062710 | On BlackDiamond 8800 or BlackDiamond X8 series switches, with Distributed IP ARP mode on, ECMP routes are sometimes not installed when gateways flap. |
| Multicast | |
| xos0063245 | With IGMP per-VLAN mode, VRRP flaps occur after adding tagged ports to VLANs. |
| xos0064519 | With MVR enabled on two VLANs, IGMP report packets are looped if sent to all hosts group. |
| xos0062705 | Kernel oops can occur after clearing IPMC FDB in a stack. |

Table 18: Resolved Issues, Platform-Specific, and Feature Change Requests (CRs) in ExtremeXOS 16.2 (continued)

| CR Number | Description |
|-----------------|--|
| xos0064357 | Out of sync between PIM and RTMgr process after introducing new best route. |
| LACP/LAG | |
| xos0062428 | Member ports with a modified speed configuration that is different than the master port should not be allowed in LAG. |
| xos0063134 | Traffic stops after disabling, and then enabling LAG portst having pstag with static FDB. |
| xos0064326 | LACP flaps when the LAG ports are added to VMANAs, with the VMAN ether type same as LACP ether type. |
| MLAG | |
| xos0064009 | MLAG+EAPS:Traffic forwarding stops after EAPS that include ISC link converges. |
| xos0064067 | Traffic loss occurs in MLAG setup when ingress port and ISC port reside on different hardware units, and when the internal port number for both of these ports is the same. |
| xos0056368 | Kernel errors occur after disabling sharing configuration on ISC ports of MLAG. For example: "exvlan: handleVsmKernelRequest:8545: handleVsmKernelRequest Invalid Ingress port: 1000008 got" |
| NetLogin | |
| xos0061433 | extremeNetloginUserLogoutTrap is received with errors. |
| xos0061868 | With protocol order as MAC dot1x, web-based UPM profile is not executed for the client, which is authenticated as MAC. |
| xos0062674 | UPM profile fails to set the variables received from the RADIUS server using VSA 212. |
| xos0063090 | NetLogin client does not move into authfail VLAN when user is absent from local database. |
| Optics | |
| xos0063120 | Error message "CFP2 modules >= 18 W unsupported" incorrectly appears for Finisar Corp CFP2 LR4 optics. |
| OSPF | |
| xos0061855 | Configured OSPF neighbor is not retained after rebooting. |
| Policy | |
| xos0062965 | Policy process ends unexpectedly with signal 6 when master node goes down. |
| QoS | |
| xos0062050 | QoS committed rate configurations for port groups are not loaded properly after a save and reboot. |
| xos0061027 | For SummitStacks, creating or deleting non-default QoS profiles may cause some ports to flap. |

Table 18: Resolved Issues, Platform-Specific, and Feature Change Requests (CRs) in ExtremeXOS 16.2 (continued)

| CR Number | Description |
|----------------------|---|
| RSVP-TE | |
| xos0062380 | Switch rejects incorrect LSP configurations as expected, but this operation still uses LSP indexes in hardware. |
| Sflow/Netflow | |
| xos0063418 | No mapping for Modid errors occur when sFlow is enabled on the port. |
| SNMP | |
| xos0057269 | SNMP trap extremelpSecurityViolation is sent with incorrect VLAN description. |
| xos0061507 | SNMPget on EXTREME-SOFTWARE-MONITOR table returns value with incorrect OID. |
| xos0057212 | SNMP traps not sent after changing or saving configuration, even though respective traps are enabled. |
| xos0063332 | Configuration changes to VPLS are not fully retrieved by SNMP walk, which returns values for only few VPLS index. |
| SSH | |
| xos0059942 | SSH connection ends when show commands produce lengthy output. |
| STP | |
| xos0057785 | STP domain tag is removed when all ports are deleted from STP auto-bind enabled-VLANs. |
| xos0062133 | STP flush event does not happen after ports are quickly disabled, and then enabled. |
| xos0062290 | Due to ExtremeXOS reflection RSTP BPDUs support, upstream bridges believe that they are receiving their own BPDUs (contain the bridge's ID), thus causing multisource events during topology changes, which can cause slow convergence times when Ip is configured (upwards of 30 seconds). |
| xos0063457 | Configuration for adding network VLAN port in STP for subscriber is not saved. |
| xos0063484 | Enhancement added in STP flush generation mechanism to reduce hardware programming load. |
| xos0064395 | STP digest value gets changed when adding the port in VLAN or removing the port from VLAN. |
| xos0062701 | HAL timeout occurs while rebooting a stack with STP configuration. |
| VLANs | |
| xos0063331 | VLAN IP address is unconfigured when modifying the VLAN name/port information from Chalet. |
| xos0063186 | Kernel oops occurs when deleting private VLAN. |
| VMANs | |

Table 18: Resolved Issues, Platform-Specific, and Feature Change Requests (CRs) in ExtremeXOS 16.2 (continued)

| CR Number | Description |
|---------------------|---|
| xos0063274 | VLAN packets are egressing with VMAN ethertype when an egress port is deleted from a VMAN that is also part of a VLAN. |
| xos0063207 | Error occurs while adding LAG ports as tagged in one VMAN and untagged in another VMAN, even though the VMAN EtherType is primary. |
| VPLS/HVPLS | |
| xos0064033 | In BlackDiamond X8 and Summit X670 series switches, traffic gets software forwarded after disabling/enabling members of a shared group and recreating the shared group after deletion. |
| xos0059596 | Can add more than one LSP a pseudo-wire when it is associated with a VPWS. |
| xos0061092 | Traffic forwarding on VPLS-serviced VMAN stops after link flap. |
| xos0062045 | LLDP packets are tunnelled over L2VPn. |
| xos0062754 | VPLS traffic egresses out with dot1q tag when secondary EtherType is configured. |
| xos0063842 | Packets are being flooded in both network and access VLAN ports after port flap. |
| VR/VRF/L3VPN | |
| xos0062128 | L3VPN traffic is not forwarded after executing <code>disable port</code> and <code>enable port</code> in MPLS core network. |
| xos0052723 | With L3VPN configured (also: OSPF, BGP, MPLS, LSP) and routes are being advertised and installed in the VRF routing table, after restarting process OSPF, VPN routes are not installed. |
| xos0061198 | Disabling VPN-VRF affects traffic on another VPN-VRF. |

4 ExtremeXOS Document Corrections

configure pim dense-neighbor-check
Load Sharing of MPLS-Terminated Packets Limitation
SummitStack Topologies
Zero Touch Provisioning (ZTP) and Stacking

This chapter lists corrections to the *ExtremeXOS 16.2 User Guide* and *ExtremeXOS 16.2 Command Reference Guide*.

configure pim dense-neighbor-check

Add the following command to the *ExtremeXOS 16.2 Command Reference Guide*

```
configure pim dense-neighbor-check [on | off]
```

Description

This command is used to configure a PIM interface that receives multicast data traffic. It could be either from a source directly connected or from a PIM neighbor. In the second case (from a source not directly connected), if the received interface has no PIM neighbor, the traffic is dropped (default behavior). If you turn off this check, the traffic is processed.

Syntax Description

| | |
|-----------------------------|---|
| dense-neighbor-check | Check if multicast traffic is received from PIM neighbor in dense mode. |
| on | Drop multicast traffic if not received from PIM neighbor (default). |
| off | Forward multicast traffic even if not received from PIM dense neighbor. |

Default

The default is on.

Example

The following example turns on dense neighbor check:

```
configure pim dense-neighbor-check on
```

History

This command was first available in ExtremeXOS 15.1.4.

Platform Availability

This command is available on platforms that support the appropriate license. For more information, see the [ExtremeXOS 16.2 Feature License Requirements](#).

Load Sharing of MPLS-Terminated Packets Limitation

In the [ExtremeXOS 16.2 User Guide](#) in **Configuring Slots and Ports on a Switch > Link Aggregation on the Switch > Load-Sharing Algorithms > BlackDiamond and SummitStack Link Aggregation Algorithms** section

xos0067338

The following note:



Note

On platforms such as Summit X670, X670v, X480, X460, and Black Diamond 8900 series I/O modules, load sharing based on inner L3 fields in the MPLS terminated packet are not supported and the packets will be forwarded as per L2 hashing.

Should be replaced with:



Note

On platforms such as Summit X670, X670v, X480, X460, and BlackDiamond 8900 series I/O modules, BDXA-10G48X and BDXA-40G24X, load sharing based on inner L3 fields in the MPLS-terminated packets is not supported and the packets are forwarded as per L2 hashing.

SummitStack Topologies

In the [ExtremeXOS 16.2 User Guide](#) in **Configuring Stacked Switches > Introduction to Stacking > SummitStack Topologies** section.

xos0067492

The following note should appear:



Note

As stacks are not necessarily a homogeneous composition of a single switch model, we do not restrict the ability to configure/create any number of settings/objects based on the capabilities of a single node that may or may not be actually present in the stack.

Zero Touch Provisioning (ZTP) and Stacking

In the [ExtremeXOS 16.2 User Guide](#), in **Getting Started > Zero Touch Provisioning (Auto Configuration)** section.

xos0067234

The following note should appear:



Note

Zero Touch Provisioning (ZTP) is not supported in stacking mode.
