ExtremeXOS Release Notes

Software Version ExtremeXOS 22.6.1-Patch1-8

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Table of Contents

Preface

This section discusses the conventions used in this guide, ways to provide feedback, additional help, and other Extreme Networks publications.

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!	New Content	Displayed next to new content. This is searchable text within the PDF.

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]**
Words in italicized type	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 www.extremenetworks.com/documentation/). 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, 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.

If you would like to provide feedback to the Extreme Networks Information Development team about this document, please contact us using our short https://www.extremenetworks.com/documentation-feedback/. You can also email us directly at documentation@extremenetworks.com.

Getting Help

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

Extreme Portal	Search the GTAC (Global Technical Assistance Center) knowledge base, manage support cases and service contracts, download software, and obtain product licensing, training, and certifications.
The Hub	A forum for Extreme Networks customers to connect with one another, answer questions, and share ideas and feedback. This community is monitored by Extreme Networks employees, but is not intended to replace specific guidance from GTAC.
Call GTAC	For immediate support: 1-800-998-2408 (toll-free in U.S. and Canada) or +1 408-579-2826. For the support phone number in your country, visit: www.extremenetworks.com/support/contact

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

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3 Select the products for which you would like to receive notifications.

Note
You can modify your product selections or unsubscribe at any time.

4 Click **Submit**.

Related Publications

ExtremeXOS Publications

- *ACL Solutions Guide*
- *ExtremeXOS 22.6 Command Reference Guide*
- *ExtremeXOS 22.6 EMS Messages Catalog*
- *ExtremeXOS 22.6 Feature License Requirements*
- *ExtremeXOS 22.6 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 21.x and Later*
- *Using AVB with Extreme Switches*

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1 Overview

These release notes document ExtremeXOS 22.6.1-Patch1-8, which adds features and resolves software deficiencies.

Security Information

The following section covers important security information for ExtremeXOS 22.6.1-Patch1-8.

OpenSSL Version

ExtremeXOS 22.6.1-Patch1-8 uses FIPS fips-ecp-2.0.16.

Linux Kernel

ExtremeXOS 22.6.1-Patch1-8 uses Linux Kernel 3.18.48, plus selected fixes released in later 3.18 patches.

Upgrading ExtremeXOS

While ExtremeXOS 22.6.1-Patch1-8 supports all features on all applicable platforms as indicated in these release notes, upgrading to ExtremeXOS 22.6.1-Patch1-8 from releases earlier than 22.2 may involve performance trade-offs of some feature on certain platforms. For information about feature- and platform-specific issues, see Open Issues on page 60 and Known Behaviors on page 63. For information about recommended releases for specific platforms, see http://www.extremenetworks.com/extreme-hardwaresoftware-compatibility-recommendation-matrices/software-release-recommendations/.

For instructions about upgrading ExtremeXOS software, see "Software Upgrade and Boot Options" in the *ExtremeXOS 22.6 User Guide*.

Beginning with ExtremeXOS 12.1, 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.

Default ExtremeXOS® Settings

Table 3 shows the default settings for ExtremeXOS 22.6.1-Patch1-8.

Table 3: Default ExtremeXOS Settings

ExtremeXOSFeature	ExtremeXOS 22.6.1-Patch1-8 Settings
Account lockout	After 3 consecutive login failures, account is locked for 5 minutes. [a]
AVB	Disabled.
BGP	Disabled.
BOOTP Relay	Disabled.
CDP	Enabled.
Configuration auto save	Disabled.
Clear-flow	Disabled.
Diagnostics	Admin level privileges required to show diagnostics. [a]
DHCP	Disabled.
IPFIX	Disabled.
EAPS	Disabled.
EDP	Enabled.
ELRP	Disabled.
ESRP	Disabled.
Extended Edge Switching (VPEX)	Disabled.
Identity Management	Disabled.
IGMP	Enabled, set to IGMPv2 compatibility mode.
IGMP Snooping	Enabled.
IP Route Compression	Enabled.
ISIS	Disabled.
Log	Admin level privileges required to show log. [a]
Logging memory buffer	Generate an event when the logging memory buffer exceeds 90% of capacity. [a]
MLD	Disabled.
MLD Snooping	Disabled.

Table 3: Default ExtremeXOS Settings (continued)

ExtremeXOSFeature	ExtremeXOS 22.6.1-Patch1-8 Settings
MPLS	Disabled.
MSRP	Disabled.
MSTP	Enabled.
NetLogin	All types of authentication are disabled.
NTP	Disabled.
OpenFlow	Disabled.
OSPF	Disabled.
OVSDB	Disabled.
Passwords	Plain text password entry not allowed. [a]
PIM	Disabled.
PIM Snooping	Disabled.
RADIUS	Disabled for both switch management and network login.
RIP	Disabled.
RMON	Disabled. However, even in the disabled state, the switch responds to RMON queries and sets for alarms and events.
sFlow	Disabled.
SNMP server	Disabled. [a]
SSH	Disabled.
Stacking	Disabled.
STP	Enabled.
Syslog	Disabled.
TACACS	Disabled.
Telnet	Disabled. [a]
VPLS	All newly created VPLS instances are enabled.
Watchdog	Enabled.
Web HTTP server	Disabled. [a]

[a] If you choose enhanced security mode when initially setting up the switch or after running `unconfigure switch all`.

Stacking Issue with ExtremeSwitching X440-G2 and X620 Series Switches

On ExtremeSwitching X440-G2 and X620 series switches, stacking is not stable with the original, un-patched ExtremeXOS 22.6.1 image (see xos0073370 in Resolved Issues in ExtremeXOS 22.6.1-Patch1-1 on page 64). Standalone (non-stacking) operation is not affected by this issue.

To use stacking, upgrade to ExtremeXOS 22.6-Patch1-1.

New and Corrected Features in ExtremeXOS 22.6.1-Patch1-8

This section lists the new and corrected features supported in the 22.6.1-Patch1-8 software:

Automation for Adding/Replacing Stack Nodes

A new automated process allows you to easily add or replace nodes in a stack.

This automation performs the following tasks in a stack:

- Adds New Nodes—When new switches are attached to an existing stack, adds those switches to the stack without manual configuration.
- Incompatible ExtremeXOS Check—Checks for and resolves incompatible ExtremeXOS software versions of stack nodes.
- License Mismatch Check—Checks for and resolves software license mismatches between all master-capable nodes.

Supported Platforms

Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X440-G2, X590, X620, X690, X870 series switches.

Limitations

- Except for the Summit X450-G2 and X460-G2 with VIM2-SS modules, all switches require that you configure stacking on the stacking ports manually (`configure stackingsupport stack-port [stack-ports | all] selection [native {V80 | V160} | V320 |V400} | alternate]`).
- License mismatches due to installing feature licenses cannot be automatically resolved. The node is left in the failed state.

Automated Configuration of Extended Edge Switching Topology

You can now automatically configure an Extended Edge Switching topology fully or partially. This capability allows for the more rapid and accurate setup of an Extended Edge Switching architecture.

The advantage of full automation is that it handles nearly all of the Extended Edge Switching configuration setup. However, the disadvantage of full automation is that you must start with a new, out-of-the-box switch or unconfigure the controlling bridge (CB) switch. To avoid unconfiguring the CB, but to still avoid manually configuring the entire Extended Edge Switching topology, you can use partial automation.

Full automation for Extended Edge Switching performs the following tasks:

1 Determines if the switch is capable of being a CB.
2 Detects if any bridge port extenders (BPEs) are attached.

Note
If no BPEs are attached, the process aborts.

3 If you are setting up redundant CBs:
   - Detects the other CB.
   - Creates a VLAN on only the port(s) between the CBs.
   - Adds link local IP address to the VLAN.
   - Creates a LAG for the port(s) between the MLAG peers.
   - When the CB detects the IP address of the other CB VLAN, creates the MLAG peer.
4 Enables VPEX mode on the CB.
5 Enables auto-configuration (partial automation), which performs the following tasks:
   a Assigns the next available slot number to each BPE.
   b Creates LAGs and MLAGs (as needed) on cascade ports.
   c Adds ports to existing cascade port LAGs.

Supported Platforms

Summit X670-G2 and ExtremeSwitching X690, X590 series switches.

Limitations

- Configured BPEs cannot be moved from one port to another port. Auto-configuration does not re-detect the BPEs.
- Auto-configuration does not reliably work on a port if there is any configuration present on that port (cascade port, LAG, or MLAG configuration). If there is LAG/MLAG/cascade configuration on a port, auto-config may not be able to detect the BPE connected to the port.
- You cannot use auto-configuration when replacing MLAG peers that have been created with user configuration, since user-configured MLAG peers may have different IP addresses, sharing configuration, port partitions, etc.
- Auto-configuration is automatically disabled on both CBs when a CB detects that its MLAG peer is down.
- When an MLAG peer comes back up, auto-configuration is not automatically re-enabled. You must re-enable auto-configuration manually.

New CLI Commands

```
enable vpex auto-configuration

disable vpex auto-configuration
```

Changed CLI Commands

The following show command now shows auto-configuration (partial automation) status:

```
show vpex
```

Multiple Spanning Tree Protocol (MSTP) on Multi-switch Link Aggregation Groups (MLAGs)

For ExtremeXOS 22.6, Multi-switch Link Aggregation Group (MLAG) is extended to Multiple Spanning Tree Protocol (MSTP), in addition to Rapid Spanning Tree Protocol (RSTP), which was introduced in ExtremeXOS 22.5.

You can configure MSTP on MLAG peers and access switches, which can prevent loops in networks containing MLAG topology. This allows third-party switches to be connected to MLAG topology (as access switches) and an MSTP domain can span ExtremeXOS and third-party switches. In typical MLAG deployments, connections can exist between access switches, which can cause data loops. By configuring MSTP on all the nodes, loops can be effectively prevented.

MSTP is supported in simple MLAG, W-MLAG, and two-tier MLAG topologies.

Supported Platforms

Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X440-G2, X590, X620, X690, X870 series switches.

Limitations

MLAG is not supported with STP (802.1D).

Local-Only Virtual Routers

Local-only Virtual Router (VR) functionality allows for separate logical IP lookup tables on switches that do not have hardware-based VR support, to be used only for IP packets to or from the switch's local IP addresses. Local-only user-created VRs allow for different gateways for routes to a host or subnet, based on the local VLANs on the switch.

Local-only VRs allow bidirectional monitoring of each individual path used to reach the switch itself, where each path may traverse, for example, a different firewall. Switches that support local-only VRs do not forward IP packets in local-only VRs in software or in hardware; they instead use separate lookup tables, including static routes, for packets to or from the switch's local IP addresses.

Supported Platforms

ExtremeSwitching X440-G2 and X620 series switches and stacks with these switches.

Limitations

- IP forwarding is not permitted on local-only VRs, or on VLANs belonging to local-only VRs.
- Local-only VRs default to having IP route compression disabled. Enabling IP route compression produces an error.

Changed CLI Commands

Changes are underlined.

`create` **`virtual-router`** *`vr-name`* **`local-only`** {**`type vrf`** {{**`vr`**} *`parent-vr-name`*}}

The following show command has a new "L" flag to signify local-only VRs.

```
show virtual-router
```

Multi-switch Link Aggregation (MLAG) Simple Network Management Protocol (SNMP) Set Support

ExtremeXOS 22.6 introduces MLAG SNMP set support in the EXTREME MLAG MIB.

Suppressing IGMP- and MLD-Triggered Queries with STP Topology Changes

Whenever Spanning Tree Protocol (STP) topology changes are received on a port, the switch sends triggered queries that mark the peer port as a router port and floods all multicast packets towards this port. You can now configure suppressing IGMP- and MLD-triggered queries when topology changes are received.

Supported Platforms

Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X440-G2, X590, X620, X690, X870 series switches.

New CLI Commands

```
configure stpd multicast send-query [on | off]
```

Changed CLI Commands

The following show command displays STP multicast send IGMP or MLD query suppression information:

```
show stpd {sptd_name | detail}
```

New Command to Show Forwarding Hardware Table Utilization Statistics

ExtremeXOS 22.6 provides a way to show forwarding hardware table utilization statistics with L2, L3, and ACLs configured.

Supported Platforms

Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X440-G2, X590, X620, X690, X870 series switches.

New CLI Commands

```
show forwarding hardware-utilization {slot [slot_num | all]}
```

sFlow Hardware Table Utilization Statistics for Stacking

sFlow is a technology for monitoring traffic in data networks containing switches and routers. It relies on statistical sampling of packets from high-speed networks, plus periodic gathering of the statistics. ExtremeXOS 22.5 expanded upon sFlow's capability by providing support for additional data structures that an sFlow agent can use to report table utilization statistics in sFlow counter samples (output of the show command). ExtremeXOS 22.6 now extends this capability to stacked switches.

Supported Platforms

Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X440-G2, X590, X870, X620, X690 series switches.

Changed CLI Commands

Changes are underlined.

`show sflow` **`hardware-utilization`** {**`slot`** [*`slot_num`* | **`all`**]}

Improved Checking During Easy Stacking Setup

ExtremeXOS 22.6 includes enhanced checking when executing easy stacking setup (`configure stacking easy-setup`). When using easy stacking setup, ExtremeXOS now checks:

1. ExtremeXOS selected partition on all nodes; if mismatch, warning message appears.
2. ExtremeXOS image version on selected partition on all nodes; if mismatch, warning message appears.
3. Effective license level on master and backup nodes; if mismatch, set stacking license-level on the node of higher level with the lower level, and then continue with easy-setup.
4. Feature pack licenses on master and backup nodes; if mismatch, warning message appears, and the command is aborted.

Supported Platforms

Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X440-G2, X590, X620, X690, X870 series switches.

New Access Control List (ACL) Match Conditions

ExtremeXOS 22.6 introduces three new access control list (ACL) match conditions.

- `ospf msg-type { version }`
- `pim msg-type`
- `packet-resolution type`

Supported Platforms

Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X440-G2, X590, X620, X690, X870 series switches.

New Command to Set VLAN Membership for Extended Edge Switching

ExtremeXOS 22.6 provides a new command to set VLAN membership for Extended Edge Switching hardware as either a hash table or virtual port group. Use port-group when large VLAN scale is required, but most Extended Edge Switching extended ports belong to up to 64 sets of VLANs.

Supported Platforms

Summit X670-G2, and ExtremeSwiching X590, X690 series switches.

New CLI Commands

```
configure forwarding vpex vlan-port-filter [hash-table | port-group]
```

Changed CLI Commands

The following show command now shows the VLAN port membership setting for Extended Edge Switching:

```
show forwarding configuration
```

Extreme Standby Router Protocol™ (ESRP) Track Ping Success Enhancement

Previously, you could only configure the number of misses allowed before declaring ping tracking failure for ESRP. You can now explicitly configure the number of successes.

Supported Platforms

Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X440-G2, X590, X620, X690, X870 series switches.

Changed CLI Commands

```
configure esrp esrpDomain add track-ping ipaddress {frequency seconds}
{miss misses} {success successes}
```

The following show command now displays track ping successes setting:

```
show esrp { {name} | {type [vpls-redundancy | standard]} }
```

Ability to Enable/Disable Reflection Bridge Protocol Data Unit (BPDU) Behavior in Spanning Tree Protocol (STP)

For Rapid Spanning Tree Protocol (RSTP) proposal handshake to work with CISCO switches, the switch that receives the proposal BPDU reflects back the same BPDU (all the contents) with an agreement flag set. This ensures that the other port is acknowledging the proposal that the switch has send out, so the acknowledgment BPDU contains the same contents of the other switch's proposal BPDU with the agreement bit set, instead of the proposal bit.

However, this behavior when used with EOS upstream bridges receiving the agreement BPDU (whose MAC OUI is different than 00:01:F4, 00:11:88, 00:1F:45, 20:B3:99) causes the switch to believe it is being sent its own BPDU, thus causing a multisource event during a topology change.

This feature allows you turn off the BPDU reflection behavior to avoid this problem.

Supported Platforms

Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X440-G2, X590, X620, X690, X870 series switches.

New CLI Commands

```
configure stpd stpd_name ports reflection-bpdu [on | off] port_list
```

Changed CLI Commands

The following show commands displays reflection BPDU status:

```
show {stpd} stpd_name ports {[detail | port_list {detail}]}
```

EXTREME PORT MIB Enhancement

ExtremeXOS 22.6 adds support for the extremePortConfigTable of the EXTREME PORT MIB to allow for set/get of port speed and duplex settings.

Supported Platforms

Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X440-G2, X590, X620, X690, X870 series switches.

New Hardware Supported in ExtremeXOS 22.6

This section lists the new hardware supported in ExtremeXOS 22.6:

ExtremeSwitching X590 series switches:

- X590-24x-1q-2c

  24 1Gb/10Gb SFP+ ports, 1 × 10Gb/40Gb QSFP+ port, 2 × 10Gb/25Gb/40Gb/50Gb/100Gb capable QSFP28 ports, 2 unpopulated power supplies slots, 4 unpopulated fan module slots, ExtremeXOS Advanced Edge License
- X590-24t-1q-2c

  24 100Mb/1Gb/10GBASE-T ports, 1 × 10Gb/40Gb QSFP+ port, 2 × 10Gb/25Gb/40Gb/50Gb/100Gb capable QSFP28 ports, 2 unpopulated power supplies slots, 4 unpopulated fan module slots, ExtremeXOS Advanced Edge License

Note

The 40G port is available in stacking mode only, and is in the NP state when ExtremeSwithcing X590 series switches are used as standalone switches or as controlling bridges in an Extended Edge Switching topology.

Updating the Programmable Logic Firmware on the Summit X440-G2 and ExtremeSwitching X620 Series Switches

You can update the programmable logic firmware components (FPGA and PLD) on the ExtremeSwitching X440-G2 and X620 series switches. Starting with ExtremeXOS 22.3, a firmware update was made available for the ExtremeSwitching X440-G2 and X620 series switches that provides the following enhancements:

- Enhanced robustness of interface-to-system LEDs and power supply status signals
- Added support for "Repeated Start" mechanism to improve interface to a subset of optics that require it
- Additional power monitoring (ExtremeSwitching X620 only)

However, because of manufacturing cut-in times, some switches may have older firmware. If the switch requires an update, the following messages appear during system start-up:

```
<Warn:HAL.Card.Warning> Switch PLD1 firmware is out of date, do 'install firmware' to
update.
<Warn:HAL.Card.Warning> Switch FPGA firmware is out of date, do 'install firmware' to
update.
```

To view the current firmware versions, use the command `show version` **`detail`**. The following shows sample output from this command with the firmware version in bold:

```
# show version detail
Switch      : 800624-00-01 1516G-01246 Rev 1.0 BootROM: 1.0.1.7    IMG: 22.3.0.35
              FPGA: 1.1.42.0 PLD1: 1.0.10.0
….
```

The new firmware versions included in ExtremeXOS 22.3 and later are FPGA 1.1.44.0 and PLD 2.0.14.0.

Use the `install firmware` command to update the firmware. Running this command requires a reboot of the switch, which can be performed at any time after the command has completed. For more information about this command, see the *ExtremeXOS 22.6 Command Reference Guide*.

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: www.extremenetworks.com/documentation/

Compatibility with ExtremeManagement (Formerly NetSight)

ExtremeXOS 22.6.1-Patch1-8 is compatible with the version of ExtremeManagement as shown in this table: http://emc.extremenetworks.com/content/common/releasenotes/extended_firmware_support.htm

Supported MIBs

The Extreme Networks MIBs are located at www.extremenetworks.com/support/policies/mibs/.

When you provide your serial number or agreement number, 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 22.6 User Guide*.

Tested Third-Party Products

This section lists the third-party products tested for ExtremeXOS 22.6.1-Patch1-8.

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 notifications about newly released software or technical service communications (for example, field notices, product change notices, etc.), register at: www.extremenetworks.com/support/service-notification-form

2 Limits

This chapter summarizes the supported limits in ExtremeXOS 22.6.1-Patch1-8.

The limits data is grouped by license level that contains the associated features:

- Edge (Supported Limits for Edge License on page 20)
- Advanced Edge (Supported Limits for Advanced Edge License on page 46)
- Core (Supported Limits for Core License on page 53)

For more information about licenses, see *ExtremeXOS 22.6 Feature License Requirements*.

The following tables summarize 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.

The scaling and performance information shown in the following tables 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 the following tables 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 tables.

In the Extended Edge Switching architecture, Layer-2, Layer-3, and multicast packet forwarding and filtering operations take place on the controlling bridge. The controlling bridge switch and attached BPEs (V400 Virtual Port Extenders) constitute a single, extended switch system. Therefore, the Extended Edge Switching system assumes the scale and limits from the specific controlling bridge model (for example, Summit X670-G2 or ExtremeSwitching X690 and X590 series switches) in use. For applicable limits, see the following tables for the controlling bridge you are using.

Supported Limits for Edge License

The following table shows supported limits for features in the Edge License.

Table 4: Supported Limits for Edge License

Metric	Product	Limit
AAA (local)—maximum number of admin and local user accounts.	All platforms	8
Access lists (meters)—maximum number of meters.	ExtremeSwitching X620, X440-G2	1,024 ingress 256 egress
	Summit X770, X670-G2, X450-G2, X460-G2	1,024 ingress 512 egress
	ExtremeSwitching X870, X690, X590	2,048 ingress 512 egress
Access lists (policies)—suggested maximum number of lines in a single policy file.	All platforms	300,000
Access lists (policies)—maximum number of rules in a single policy file.[a]	Summit X460-G2, X450-G2, X770, X670-G2	4,096 ingress 1,024 egress
	ExtremeSwitching X620, X440-G2	2,048 ingress 512 egress
	ExtremeSwitching X870	3,072 ingress 1,024 egress
	ExtremeSwitching X690, X590	8,192 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	2,048 ingress only
	Summit X670-G2, X770, ExtremeSwitching X870, X690	1,024 ingress only
	ExtremeSwitching X620, X440-G2	512 ingress only
	ExtremeSwitching X590	2,048 ingress only
Access lists (slices)—number of ACL slices.	Summit X460-G2, X450-G2	16 ingress 4 egress
	Summit X770, X670-G2, ExtremeSwitching X690, X590	12 ingress 4 egress
	ExtremeSwitching X440-G2, X620	8 ingress 4 egress
	ExtremeSwitching X870	4 ingress 4 egress
Access lists (slices)—number of ACL slices in first stage (VFP).	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	4 ingress only
ACL Per Port Meters—number of meters supported per port.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	16
ACL port ranges	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	32
Meters Packets-Per-Second Capable	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	Yes

Table 4: Supported Limits for Edge License (continued)

Metric	Product	Limit
AVB (audio video bridging)—maximum number of active streams.	Summit X450-G2, X460-G2, X770, and ExtremeSwitching X620, X440-G2	1,024
	Summit X670-G2	4,096
	ExtremeSwitching X590, X690, X870	N/A
BFD sessions (Software Mode)—maximum number of BFD sessions.	Summit X460-G2, X670-G2, X450-G2, X770, ExtremeSwitching X440-G2, X620, X870, X690, X590 (default timers—1 sec)	512
	Summit X460-G2, X670-G2, X450-G2, X770, ExtremeSwitching X440-G2, X620, X870, X690, X590 (minimal timers—100 msec)	10 [c]
BFD IPv4 sessions (Hardware Assisted)—maximum number of IPv4 BFD sessions.	Summit X460-G2, ExtremeSwitching X870, X690, X590	900 (PTP not enabled) 425 (PTP enabled) 256 (with 3 ms transmit interval)
BFD IPv6 sessions (Hardware Assisted)—maximum number of IPv6 BFD sessions.	Summit X460-G2, ExtremeSwitching X870, X690, X590	425 (PTP not enabled)
BOOTP/DHCP relay—maximum number of BOOTP or DHCP servers per virtual router.	Summit X460-G2, X670-G2, X770, X450-G2, and ExtremeSwitching X440-G2, X620, X870, X690, X590	8
BOOTP/DHCP relay—maximum number of BOOTP or DHCP servers per VLAN.	Summit X460-G2, X670-G2, X770, X450-G2, and ExtremeSwitching X440-G2, X620, X870, X690, X590	8
BOOTP/DHCP relay—maximum number of DHCPv4/v6 relay agents	Summit X460-G2, X670-G2, X770, X450-G2, and ExtremeSwitching X440-G2, X620, X870, X690, X590	4,000
Connectivity fault management (CFM)—maximum number or CFM domains. Note: With Advanced Edge license or higher.	Summit X460-G2, X670-G2, X770, X450-G2, and ExtremeSwitching X440-G2, X620, X870, X690, X590	8
CFM—maximum number of CFM associations. Note: With Advanced Edge license or higher.	Summit X460-G2, X670-G2, X770, X450-G2, and ExtremeSwitching X440-G2, X620, X870, X690, X590	256
CFM—maximum number of CFM up end points. Note: With Advanced Edge license or higher.	Summit X460-G2, X670-G2, X770, X450-G2, and ExtremeSwitching X440-G2, X620, X870, X690, X590	32

Table 4: Supported Limits for Edge License (continued)

Metric	Product	Limit
CFM—maximum number of CFM down end points. Note: With Advanced Edge license or higher.	Summit X670-G2, X770, X450-G2, and ExtremeSwitching X440-G2, X620, X870, X690, X590 Summit X460-G2	32 256 (non-load shared ports) 32 (load shared ports)
CFM—maximum number of CFM remote end points per up/down end point. Note: With Advanced Edge license or higher.	Summit X460-G2, X670-G2, X770, X450-G2, and ExtremeSwitching X440-G2, X620, X870, X690, X590	2,000
CFM—maximum number of dot1ag ports. Note: With Advanced Edge license or higher.	Summit X460-G2, X670-G2, X770, X450-G2, and ExtremeSwitching X440-G2, X620, X870, X690, X590	128
CFM—maximum number of CFM segments. Note: With Advanced Edge license or higher.	Summit X460-G2, X670-G2, X770, X450-G2, and ExtremeSwitching X440-G2, X620, X870, X690, X590	1,000
CFM—maximum number of MIPs. Note: With Advanced Edge license or higher.	Summit X460-G2, X670-G2, X770, X450-G2, and ExtremeSwitching X620, X440-G2, X870, X690, X590	256
CLEAR-Flow—total number of rules supported. The ACL rules plus CLEAR-Flow rules must be less than the total number of supported ACLs.	Summit X460-G2, X770, X670-G2, X450-G2 ExtremeSwitching X440-G2, X620 ExtremeSwitching X870 ExtremeSwitching X690, X590	4,094 1,024 3,072 8,192
Data Center Bridging eXchange (DCBX) protocol Type Length Value (TLVs)—maximum number of DCBX application TLVs.	Summit X460-G2, X670-G2, X770, X450-G2, and ExtremeSwitching X440-G2, X620, X870, X690, X590	8
DHCPv6 Prefix Delegation Snooping—Maximum number of DHCPv6 prefix delegation snooped entries.	Summit X460-G2, X670-G2, X770, X450-G2, and ExtremeSwitching X620, X440-G2, X870, X690, X590	256 (with Underlying Protocol Ripng) 128 (with Underlying protocol OSPFv3) 1,024 (with static routes)
DHCP snooping entries—maximum number of DHCP snooping entries.	Summit X460-G2, X670-G2, X770, X450-G2, and ExtremeSwitching X620, X440-G2, X870, X690, X590	2,048

Table 4: Supported Limits for Edge License (continued)

Metric	Product	Limit
Dynamic ACLs—maximum number of ACLs processed per second. Note: Limits are load dependent.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590 with 50 DACLs with 500 DACLs	 10 5
EAPS domains—maximum number of EAPS domains. Note: An EAPS ring that is being spatially reused cannot have more than four configured EAPS domains. Note: You can increase the number of domains by upgrading to the Advanced Edge license.	Summit X670-G2, X450-G2, X460-G2, X770,and ExtremeSwitching X440-G2, X620, X870, X690, X590	4
EAPSv1 protected VLANs—maximum number of protected VLANs.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2 ExtremeSwitching X870, X690, X590	1,000 2,000
ERPS domains—maximum number of ERPS domains with or without CFM configured. Note: You can increase the number of domains by upgrading to the Advanced Edge license.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	4
ERPSv1 protected VLANs—maximum number of protected VLANs.	ExtremeSwitching X870, X690, X590 Summit X450-G2, X460-G2, X670-G2, X770, ExtremeSwitching X620, X440-G2	2,000 1,000
ERPSv2 protected VLANs—maximum number of protected VLANs.	Summit X450-G2, X460-G2, X670-G2, and ExtremeSwitching X870, X690, X590 Summit X770, ExtremeSwitching X620, X440-G2	2,000 500
ELSM (vlan-ports)—maximum number of VLAN ports.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X870, X690, X590 ExtremeSwitching X440-G2	5,000 4,000
Extended Edge Switching maximum BPEs—maximum number of attached bridge port extenders (BPEs).	Summit X670-G2, ExtremeSwitching X690, X590	48
Extended Edge Switching maximum cascade ports—maximum number of upstream ports on bridge port extenders (BPEs).	Summit X670-G2, ExtremeSwitching X690, X590	2 on V400-24 models 4 on V400-48 models
Extended Edge Switching maximum tiers—maximum number of cascade levels (tiers) of bridge port extenders (BPEs).	Summit X670-G2, ExtremeSwitching X690, X590	4

Table 4: Supported Limits for Edge License (continued)

Metric	Product	Limit
Extended Edge Switching VLAN+ port memberships—maximum number of VLAN+ (extended) port memberships.	Summit X670-G2, ExtremeSwitching X690, X590	12,000 in hash mode (default) 131,000 in port-group mode
Forwarding rate—maximum L3 software forwarding rate.	ExtremeSwitching X690, X590	30,000 pps
	ExtremeSwitching X870	32,000 pps
	Summit X450-G2	16,000 pps
	Summit X460-G2	17,000 pps
	ExtremeSwitching X620	10,000 pps
	Summit X670-G2	15,000 pps
	Summit X770	6,500 pps
	ExtremeSwitching X440-G2	9,000 pps
FDB (unicast blackhole entries)—maximum number of unicast blackhole FDB entries.	Summit X460-G2	49,152[f]
	Summit X770, X670-G2	294,912[f]
	Summit X450-G2	34,816[f]
	ExtremeSwitching X620, X440-G2	16,384[f]
	ExtremeSwitching X870	139,264[f]
	ExtremeSwitching X690, X590	278,528[f]
FDB (multicast blackhole entries)—maximum number of multicast blackhole FDB entries.	Summit X460-G2, X450-G2, and ExtremeSwitching X440-G2, X620	1,024
	Summit X770, X670-G2, ExtremeSwitching X870, X690, X590	4,096
FDB (maximum L2 entries)—maximum number of MAC addresses.	Summit X460-G2	98,300[g]
	Summit X770, X670-G2	294,912[g]
	Summit X450-G2	68,000[g]
	ExtremeSwitching X620, X440-G2	16,384
	ExtremeSwitching X870	139,264[g]
	ExtremeSwitching X690, X590	278,528[g]
FDB (Maximum L2 entries)—maximum number of multicast FDB entries.	Summit X770, X670-G2, ExtremeSwitching X870, X690, X590	4,096
	Summit X450-G2, X460-G2, and ExtremeSwitching X620, X440-G2	1,024
Identity management—maximum number of Blacklist entries.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	512
Identity management—maximum number of Whitelist entries.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	512
Identity management—maximum number of roles that can be created.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	64

Table 4: Supported Limits for Edge License (continued)

Metric	Product	Limit
Identity management—maximum role hierarchy depth allowed.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	5
Identity management—maximum number of attribute value pairs in a role match criteria.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	16
Identity management—maximum of child roles for a role.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	8
Identity management—maximum number of policies/dynamic ACLs that can be configured per role.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	8
Identity management—maximum number of LDAP servers that can be configured.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	8
Identity management—maximum number of Kerberos servers that can be configured.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	20
Identity management—maximum database memory-size.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	512
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.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	100
Identity management—recommended number of ACL entries per identity. Note: Number of ACLs per identity based on system ACL limitation.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	20
Identity management—maximum number of dynamic ACL entries configured as an individual dynamic rule, or as an ACL entry in a policy file.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	500
IGMP snooping per VLAN filters—maximum number of VLANs supported in per-VLAN IGMP snooping mode.	Summit X460-G2, ExtremeSwitching X870 Summit X450-G2 Summit X770, X670-G2 ExtremeSwitching X620, X440-G2 ExtremeSwitching X690, X590	1,500 2,048 2,000 1,000 4,000
IGMPv1/v2 SSM-map entries—maximum number of IGMPv1/v2 SSM mapping entries.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	500

Table 4: Supported Limits for Edge License (continued)

Metric	Product	Limit
IGMPv1/v2 SSM-map entries—maximum number of sources per group in IGMPv1/v2 SSM mapping entries.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	50
IGMPv2 subscriber—maximum number of IGMPv2 subscribers per port.[n]	Summit X770, X670-G2, X460-G2, X450-G2	4,000
	ExtremeSwitching X440-G2, X620	3,500
	ExtremeSwitching X870, X690, X590	4,000
IGMPv2 subscriber—maximum number of IGMPv2 subscribers per switch.[n]	Summit X770, X670-G2	30,000
	Summit X460-G2, X450-G2	20,000
	ExtremeSwitching X620, X440-G2	17,500
	ExtremeSwitching X870, X690, X590	45,000
IGMPv3 maximum source per group—maximum number of source addresses per group.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	250
IGMPv3 subscriber—maximum number of IGMPv3 subscribers per port.[n]	Summit X770, X670-G2, X460-G2, X450-G2	4,000
	ExtremeSwitching X440-G2, X620	3,500
	ExtremeSwitching X870, X690, X590	4,000
IGMPv3 subscriber—maximum number of IGMPv3 subscribers per switch.[n]	Summit X460-G2, X450-G2	20,000
	Summit X770, X670-G2	30,000
	ExtremeSwitching X620, X440-G2	17,500
	ExtremeSwitching X870, X690, X590	45,000
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).	Summit X670-G2, X770	131,072 (up to)[h]
	Summit X460-G2	57,344 (up to)[h]
	Summit X450-G2	47,000 (up to)[h]
	ExtremeSwitching X440-G2, X620	20,480
	ExtremeSwitching X870	94,206 (up to)[h]
	ExtremeSwitching X690, X590	157,694 (up to)[h]
IPv4 ARP entries in hardware with minimum LPM routes—maximum recommended number of IPv4 ARP entries in hardware, with minimum LPM routes present. Assumes number of IP route reserved entries is 100 or less.	ExtremeSwitching X870	74,000 (up to)[h]
	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]
	ExtremeSwitching X620	1,500
	ExtremeSwitching X440-G2	1,000
	ExtremeSwitching X690, X590	122,000 (up to)[h]

Table 4: Supported Limits for Edge License (continued)

Metric	Product	Limit
IPv4 ARP entries in hardware with maximum LPM routes—maximum recommended number of IPv4 ARP entries in hardware, with maximum LPM routes present. Assumes number of IP route reserved entries is "maximum."	ExtremeSwitching X870	64,000 (up to)[h]
	Summit X460-G2	43,000 (up to)[h]
	Summit X770, X670-G2	98,000 (up to)[h]
	Summit X450-G2	29,000 (up to)[h]
	ExtremeSwitching X620	1,500
	ExtremeSwitching X440-G2	1,000
	ExtremeSwitching X690, X590	112,000 (up to) [h]
IP flow information export (IPFIX)—number of simultaneous flows.	Summit X460-G2	2,048 ingress 2,048 egress
	Summit X450-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	N/A
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. Assumes number of IP route reserved entries is 0, and number of IPv4 ARP entries present is 100 or less.	ExtremeSwitching X870	120,000 (up to)[h]
	Summit X460-G2	73,000[h]
	Summit X770, X670-G2	176,000 (up to)[h]
	Summit X450-G2	61,000 (up to)[h]
	ExtremeSwitching X440-G2, X620	3,500
	ExtremeSwitching X690, X590	216,000 (up to) [h]
IPv4 routes—maximum number of IPv4 routes in software (combination of unicast and multicast routes), including static and from all routing protocols.	Summit X460-G2, X450-G2, X440-G2, X620	25,000
	Summit X670-G2, ExtremeSwitching X690, X870, X590	131,000
	Summit X770	100,000
IPv4 routes (LPM entries in hardware) — number of IPv4 routes in hardware.	Summit X460-G2	12,000
	Summit X450-G2	16,000
	Summit X670-G2, X770, ExtremeSwitching X690, X870, X590	131,000 [q]
	ExtremeSwitching X620, X440-G2	480
IPv6 6in4 tunnel—maximum number of IPv6 6in4 tunnels.	Summit X450-G2, X460-G2, X670-G2, X770, ExtremeSwitching X870, X690, X590	255
	ExtremeSwitching X440-G2, X620	N/A
IPv6 6to4 tunnel—maximum number of IPv6 6to4 tunnels.	Summit X450-G2, X460-G2, X670-G2, X770, ExtremeSwitching X870, X690, X590	1 (per virtual router)
	ExtremeSwitching X440-G2, X620	N/A

Table 4: Supported Limits for Edge License (continued)

Metric	Product	Limit
IPv6 addresses on an interface—maximum number of IPv6 addresses on an interface.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	255
IPv6 addresses on a switch—maximum number of IPv6 addresses on a switch.	Summit X770, X670-G2, X460-G2, X450-G2, ExtremeSwitching X870, X690, X590	2,048
	ExtremeSwitching X620, X440-G2	510
IPv6 host entries in hardware—maximum number of IPv6 neighbor entries in hardware.	Summit X770, X670-G2	36,750 [h]
	Summit X460-G2	22,000 [h]
	Summit X450-G2	12,000 [h]
	ExtremeSwitching X440-G2	1,000
	ExtremeSwitching X620	1,500
	ExtremeSwitching X690, X590	32,000 [h]
	ExtremeSwitching X870	22,000 [h]
IPv6 routes in software—maximum number of IPv6 routes in software, including static routes and routes from all routing protocols.	Summit X450-G2, X460-G2, and ExtremeSwitching X620, X440-G2	25,000
	Summit X670-G2, X770, ExtremeSwitching X690, X870, X590	65,000 [q]
IPv6 routes (LPM entries in hardware)—maximum number of IPv6 routes in hardware.	Summit X460-G2	6,000
	Summit X450-G2	8,000
	Summit X670-G2, X770, ExtremeSwitching X690, X870, X590	65,000 [q]
	ExtremeSwitching X620, X440-G2,	240
IPv6 routes with a mask greater than 64 bits in hardware—maximum number of such IPv6 LPM routes in hardware.	Summit X670-G2, X770, ExtremeSwitching X690, X870, X590	8,192 [r]
	ExtremeSwitching X440-G2, X620	1,024
	Summit X450-G2, X460-G2	2,048
IPv6 route sharing in hardware—route mask lengths for which ECMP is supported in hardware.	Summit X460-G2, X450-G2, and ExtremeSwitching X620	0–64 >64 single path only
	Summit X670-G2, X770, and ExtremeSwitching X690, X870, X590	0–128 [r]
	ExtremeSwitching X440-G2	Not supported
IP router interfaces—maximum number of VLANs performing IPv4 and/or IPv6 routing. Excludes sub-VLANs.	Summit X460-G2, X770, X670-G2, X450-G2, ExtremeSwitching X870, X690, X590	2,048
	ExtremeSwitching X620, X440-G2	510
IP multicast static routes—maximum number of permanent multicast IP routes.	Summit X460-G2, X670-G2, X450-G2, X770, ExtremeSwitching X870, X690, X590	1,024

Table 4: Supported Limits for Edge License (continued)

Metric	Product	Limit
IP unicast static routes—maximum number of permanent IP unicast routes.	Summit X460-G2, X670-G2, X450-G2, X770, ExtremeSwitching X870, X690, X590	1,024
	ExtremeSwitching X620, X440-G2	480
IP route sharing (maximum gateways)—Configurable maximum number of gateways used by equal cost multipath OSPF, BGP, IS-IS, static routes, or L2VPNs. Static routes, OSPF, and BGP are limited to 64 ECMP gateways per destination, while IS-IS is limited to 8. 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.	Summit X460-G2, X670-G2, X450-G2, X770, and ExtremeSwitching X620, X870, X690, X590	2, 4, 8, 16, 32, or 64
	ExtremeSwitching X440-G2	N/A

Table 4: Supported Limits for Edge License (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.	Summit X670-G2, X770	
	if maximum gateways is 2	1,022
	if maximum gateways is 4	1,022
	if maximum gateways is 8	1,022
	if maximum gateways is 16 (default)	1,022
	if maximum gateways is 32	510
	if maximum gateways is 64	254
	Summit X460-G2, X450-G2	
	if maximum gateways is 2	1,022
	if maximum gateways is 4	1,022
	if maximum gateways is 8	510
	if maximum gateways is 16 (default)	254
	if maximum gateways is 32	126
	if maximum gateways is 64	62
	ExtremeSwitching X620	
	if maximum gateways is 2	126
	if maximum gateways is 4	126
	if maximum gateways is 8	126
	if maximum gateways is 16 (default)	126
	if maximum gateways is 32	62
	if maximum gateways is 64	30
	ExtremeSwitching X690, X590	
	if maximum gateways is 2	4,094
	if maximum gateways is 4	4,094
	if maximum gateways is 8	2,046
	if maximum gateways is 16 (default)	1,022
	if maximum gateways is 32	510
	if maximum gateways is 64	254
	Note: The values here represent the maximum attainable ECMP groups of which, due to the RIOT feature, half are reserved for overlay and half for underlay routing. For more information about RIOT, see the *ExtremeXOS 22.6 User Guide*.	
	ExtremeSwitching X870	
	if maximum gateways is 2	2,046
	if maximum gateways is 4	2,046
	if maximum gateways is 8	2,046
	if maximum gateways is 16 (default)	1,022
	if maximum gateways is 32	510
	if maximum gateways is 64	254
	ExtremeSwitching X440-G2	N/A

Table 4: Supported Limits for Edge License (continued)

Metric	Product	Limit
IP multinetting (secondary IP addresses)—maximum number of secondary IP addresses per VLAN.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	255
Jumbo frames—maximum size supported for jumbo frames, including the CRC.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	9,216
L2 VPN: VCCV (pseudowire Virtual Circuit Connectivity Verification) VPNs per switch—maximum number of VCCV enabled VPLS VPNs.	Summit X460-G2, X670-G2, X770, ExtremeSwitching X870, X690, X590	16
	Summit X450-G2, and ExtremeSwitching X620, X440-G2	N/A
L2 VPN: VPLS MAC addresses—maximum number of MAC addresses learned by a switch.	Summit X770	128,000
	Summit X670-G2, ExtremeSwitching X690, X590	140,000
	Summit X460-G2	55,000
	ExtremeSwitching X870	65,000
	Summit X450-G2, and ExtremeSwitching X620, X440-G2	N/A
L2 VPN: VPLS VPNs—maximum number of VPLS virtual private networks per switch.	Summit X460-G2, X770, X670-G2, ExtremeSwitching X870, X690, X590	1,023
	Summit X450-G2, and ExtremeSwitching X620, X440-G2	N/A
L2 VPN: VPLS peers—maximum number of VPLS peers per VPLS instance.	Summit X770, X670-G2, X460-G2, ExtremeSwitching X870, X690, X590	64
	Summit X450-G2, and ExtremeSwitching X620, X440-G2	N/A
L2 VPN: LDP pseudowires—maximum number of pseudowires per switch.	Summit X770, X670-G2, X460-G2, and ExtremeSwitching X870, X690, X590	7,000
	Summit X450-G2, and ExtremeSwitching X620, X440-G2	N/A
L2 VPN: static pseudowires—maximum number of static pseudowires per switch.	Summit X670-G2, X460-G2, X770, ExtremeSwitching X870, X690, X590	7,000
	Summit X450-G2, and ExtremeSwitching X620, X440-G2	N/A
L2 VPN: Virtual Private Wire Service (VPWS) VPNs—maximum number of virtual private networks per switch.	Summit X770	4,000
	Summit X670-G2, ExtremeSwitching X870, X690, X590	4,090
	Summit X460-G2	1,023
	Summit X450-G2, and ExtremeSwitching X620, X440-G2	N/A

Table 4: Supported Limits for Edge License (continued)

Metric	Product	Limit
Layer-2 IPMC forwarding caches—(IGMP/MLD/PIM snooping) in mac-vlan mode. Note: • The internal lookup table configuration used is "l2-and-l3". • 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 same.	Summit X770, X670-G2 Summit X460-G2 Summit X450-G2 ExtremeSwitching X620, X440-G2 ExtremeSwitching X870 ExtremeSwitching X690, X590	73,000 24,000 14,000 5,000 36,000 67,000
Layer-3 IPv4 Multicast—maximum number of <S,G,V> entries installed in the hardware (IP multicast compression enabled). Note: • Limit value same for MVR senders, PIM Snooping entries. PIM SSM cache, IGMP senders, PIM cache. • The internal lookup table configuration used is "more l3-and-ipmc". • Assumes source-group-vlan mode as look up key. • Layer 3 IPMC cache limit in mixed mode also has the same value.	Summit X460-G2 Summit X450-G2 Summit X770, X670-G2 ExtremeSwitching X620, X440-G2 ExtremeSwitching X870 ExtremeSwitching X690, X590	26,000 21,000 77,500 1,500 52,000 93,000
Layer-3 IPv6 Multicast—maximum number of <S,G,V> entries installed in the hardware (IP multicast compression enabled). Note: • Limit value same for MLD sender per switch,PIM IPv6 cache. • The internal lookup table configuration used is "more l3-and-ipmc". • Assumes source-group-vlan mode as look up key.	Summit X770, X670-G2 Summit X460-G2 Summit X450-G2 ExtremeSwitching X620, X440-G2 ExtremeSwitching X870 ExtremeSwitching X690, X590	30,000 14,000 10,000 700 18,000 48,000

Table 4: Supported Limits for Edge License (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.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	128
Load sharing—maximum number of ports per load-sharing group.	For standalone and stacked: ExtremeSwitching X620, X440-G2 For standalone: Summit X770, X670-G2, X460-G2, X450-G2, ExtremeSwitching X870, X690, X590 For stacked: Summit X770, X670-G2, X460-G2, X450-G2, X670-G2, and ExtremeSwitching X870, X690, X590	8 32 64
Logged messages—maximum number of messages logged locally on the system.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	20,000
MAC-based security—maximum number of MAC-based security policies.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	1,024
MAC Locking—Maximum number of MAC locking stations that can be learned on a port.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	64 (static MAC locking stations) 600 (first arrival MAC locking stations)
Meters—maximum number of meters supported.	Summit X460-G2, X450-G2, X670-G2, X770, ExtremeSwitching X440-G2, X620, X870, X690, X590	2,048

Table 4: Supported Limits for Edge License (continued)

Metric	Product	Limit
Maximum mirroring instances	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X870, X690, X590 **Note:** Only two or four mirroring instances 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 you to use a total of four slots, while there are no more than 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)
	ExtremeSwitching X620, X440-G2 **Note:** For stacks containing X620 or X440-G2, maximum supported egress mirror instances is 1.	1 (egress)
Mirroring (filters)—maximum number of mirroring filters. **Note:** This is the number of filters across all the active mirroring instances.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	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.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	128
Mirroring, one-to-many (monitor port)—maximum number of one-to-many monitor ports.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	16

Table 4: Supported Limits for Edge License (continued)

Metric	Product	Limit
MLAG ports—maximum number of MLAG ports allowed.	Summit X670-G2, ExtremeSwitching X690	71
	ExtremeSwitching X440-G2, Summit X450-G2	51
	Summit X460-G2	53
	Summit X770	103
	ExtremeSwitching X620	15
	ExtremeSwitching X870	127
	ExtremeSwitching X590	35
MLAG peers—maximum number of MLAG peers allowed.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	2
MPLS RSVP-TE interfaces—maximum number of interfaces.	Summit X460-G2, X670-G2, X770, ExtremeSwitching X870, X690	32
	Summit X450-G2, and ExtremeSwitching X440-G2, X620	N/A
MPLS RSVP-TE ingress LSPs—maximum number of ingress LSPs.	Summit X460-G2, X670-G2, X770, ExtremeSwitching X870, X690	2,000
	Summit X450-G2, and ExtremeSwitching X440-G2, X620	N/A
MPLS RSVP-TE egress LSPs—maximum number of egress LSPs.	Summit X460-G2, X670-G2, X770, ExtremeSwitching X870, X690	2,000
	Summit X450-G2, and ExtremeSwitching X440-G2, X620	N/A
MPLS RSVP-TE transit LSPs—maximum number of transit LSPs.	Summit X460-G2, X670-G2, X770	2,000
	ExtremeSwitching X870, X690	4,000
	Summit X450-G2, and ExtremeSwitching X440-G2, X620	N/A
MPLS RSVP-TE paths—maximum number of paths.	Summit X460-G2, X770	1,000
	Summit X670-G2, ExtremeSwitching X870, X690	2,000
	Summit X450-G2, and ExtremeSwitching X440-G2, X620	N/A
MPLS RSVP-TE profiles—maximum number of profiles.	Summit X460-G2, X770	1,000
	Summit X670-G2, ExtremeSwitching X870, X690	2,000
	Summit X450-G2, and ExtremeSwitching X440-G2, X620	N/A
MPLS RSVP-TE EROs—maximum number of EROs per path.	Summit X460-G2, X670-G2, X770, ExtremeSwitching X870, X690	64
	Summit X450-G2, and ExtremeSwitching X440-G2, X620	N/A

Table 4: Supported Limits for Edge License (continued)

Metric	Product	Limit
MPLS LDP peers—maximum number of MPLS LDP peers per switch.	Summit X770	64
	Summit X670-G2, X460-G2, ExtremeSwitching X870, X690	128
	Summit X450-G2, and ExtremeSwitching X440-G2, X620	N/A
MPLS LDP adjacencies—maximum number of MPLS LDP adjacencies per switch.	Summit X460-G2	50
	Summit X770, X670-G2, ExtremeSwitching X870, X690	64
	Summit X450-G2, and ExtremeSwitching X440-G2, X620	N/A
MPLS LDP ingress LSPs—maximum number of MPLS LSPs that can originate from a switch.	Summit X770, X670-G2, X460-G2, ExtremeSwitching X870, X690	2,048
	Summit X450-G2, and ExtremeSwitching X440-G2, X620	N/A
MPLS LDP-enabled interfaces—maximum number of MPLS LDP configured interfaces per switch.	Summit X770	64
	Summit X670-G2, X460-G2, ExtremeSwitching X870, X690	128
	Summit X450-G2, and ExtremeSwitching X440-G2, X620	N/A
MPLS LDP transit LSPs—maximum number of MPLS transit LSPs per switch.	Summit X770, X670-G2, X460-G2, ExtremeSwitching X870, X690	4,000
	Summit X450-G2, and ExtremeSwitching X440-G2, X620	N/A
MPLS LDP egress LSPs—maximum number of MPLS egress LSPs that can terminate on a switch.	Summit X670-G2, X460-G2, X770, ExtremeSwitching X870, X690	4,000
	Summit X450-G2, and ExtremeSwitching X440-G2, X620	N/A
MPLS static egress LSPs—maximum number of static egress LSPs.	Summit X460-G2	7,116
	Summit X770, ExtremeSwitching X870, X690	8,000
	Summit X670-G2	15,308
	Summit X450-G2, and ExtremeSwitching X440-G2, X620	N/A
MPLS static ingress LSPs—maximum number of static ingress LSPs.	Summit X460-G2, ExtremeSwitching X870, X690	4,000
	Summit X770, X670-G2	2,048
	Summit X450-G2, and ExtremeSwitching X440-G2, X620	N/A
MPLS static transit LSPs—maximum number of static transit LSPs	Summit X770, X670-G2, X460-G2, ExtremeSwitching X870, X690	4,000
	Summit X450-G2, and ExtremeSwitching X440-G2, X620	N/A

Table 4: Supported Limits for Edge License (continued)

Metric	Product	Limit
Multicast listener discovery (MLD) snooping per-VLAN filters—maximum number of VLANs supported in per-VLAN MLD snooping mode.	Summit X460-G2, X770, X670-G2, ExtremeSwitching X870	1,200
	Summit X450-G2	512
	ExtremeSwitching X620, X440-G2	600
	ExtremeSwitching X690, X590	1,500
Multicast listener discovery (MLD)v1 subscribers—maximum number of MLDv1 subscribers per port.[n]	Summit X770, X670-G2, X450-G2, X460-G2	4,000
	ExtremeSwitching X620, X440-G2	3,500
	ExtremeSwitching X870, X690, X590	4,000
Multicast listener discovery (MLD)v1 subscribers—maximum number of MLDv1 subscribers per switch.[n]	Summit X460-G2, X450-G2, ExtremeSwitching X620, X440-G2	10,000
	Summit X770, X670-G2	30,000
	ExtremeSwitching X870, X690, X590	45,000
Multicast listener discovery (MLD)v2 subscribers—maximum number of MLDv2 subscribers per port.[n]	Summit X770, X670-G2, X460-G2, X450-G2	4,000
	ExtremeSwitching X620, X440-G2	3,500
	ExtremeSwitching X870, X690, X590	4,000
Multicast listener discovery (MLD)v2 subscribers—maximum number of MLDv2 subscribers per switch.[n]	Summit X770, X670-G2	30,000
	Summit X460-G2, X450-G2, ExtremeSwitching X620, X440-G2	10,000
	ExtremeSwitching X870, X690, X590	45,000
Multicast listener discovery (MLD)v2 maximum source per group—maximum number of source addresses per group.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	200
Multicast listener discovery (MLD) SSM-map entries—maximum number of MLD SSM mapping entries.	Summit X450-G2, X460-G2, X670-G2, X770, ExtremeSwitching X870, X690, X590	500
	ExtremeSwitching X440-G2, X620	50
Multicast listener discovery (MLD) SSM-MAP entries—maximum number of sources per group in MLD SSM mapping entries.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	50
Network Login—maximum number of clients being authenticated on MAC-based VLAN enabled ports.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	1,024
Network Login—maximum number of clients being authenticated with policy mode enabled with TCI overwrite enabled.	Summit X450-G2, X460-G2, ExtremeSwitching X590	1,024
	Summit X670-G2, X770, ExtremeSwitching X870, X690	512
	ExtremeSwitching X620, X440-G2	256

Table 4: Supported Limits for Edge License (continued)

Metric	Product	Limit
Network Login—maximum number of dynamic VLANs.	Summit X460-G2, X450-G2, X670-G2, X770, ExtremeSwitching X870, X690, X590	2,000
	ExtremeSwitching X440-G2, X620	1,024
Network Login VLAN VSAs—maximum number of VLANs a client can be authenticated on at any given time.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	10
Network Service Identifiers (NSI)/ VLAN mappings—maximum number of VLANs to NSI mappings.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	94
Node Alias—maximum number of entries per slot.	Summit X450-G2, X460-G2, X670-G2, X770 and ExtremeSwitching X620, X440-G2, X870, X690, X590	8,192
ONEPolicy Roles/Profiles—maximum number of policy roles/profiles.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	63
ONEPolicy Rules per Role/Profile—maximum number of rules per role/ policy.	Summit X450-G2, X460-G2	IPv6 rules: 256 IPv4 rules: 256 L2 Rules: 184 MAC Rules: 256
	Summit X670-G2, X770, ExtremeSwitching X870	IPv6 Rules: 256 L2 Rules: 184 MAC Rules: 256 IPv4 Rules: 256
	ExtremeSwitching X620, X440-G2	IPv6 and Mac Rules: 0 Ipv4 Rules: 256 (per switch) L2 Rules: 184 (per switch)
	ExtremeSwitching X690, X590	IPv4 Rules: 512 IPv6 Rules: 512 MAC Rules: 512 L2 Rules: 440
ONEPolicy Authenticated Users per Switch—maximum number of authenticated users per port only with TCI-Overwrite enabled.	Summit X450-G2, X460-G2, and ExtremeSwitching X590	1,024
	Summit X670-G2, X770, ExtremeSwitching X690, X870	512
	ExtremeSwitching X620, X440-G2	256
	Stacking	Depends on the stack nodes.

Table 4: Supported Limits for Edge License (continued)

Metric	Product	Limit
ONEPolicy Authenticated Users per Switch—maximum number of authenticated users per switch with TCI-Overwrite disabled. Note: The maximum values assume 75% utilization of VLAN-XLATE hash table.	ExtremeSwitching X690, X590	24,576
	Summit X670-G2, X460-G2, ExtremeSwitching X870	12,288
	Summit X770, X450-G2	6,144
	ExtremeSwitching X620, X440-G2	1,536
	Stacking	1,536–65,534
ONEPolicy Authenticated Users per Port per Switch— maximum number of authenticated users per port per switch with TCI overwrite disabled. Note: The maximum values assume 75% utilization of VLAN-XLATE hash table.	Summit X450-G2, X770	6,144
	Summit 460-G2, X670-G2, and ExtremeSwitching X870	12,288
	ExtremeSwtiching X690, X590	24,576
	ExtemeSwtiching X440-G2, X620	1,536
ONEPolicy Authenticated Users per Port per Switch— maximum number of authenticated users per port with only with TCI-Overwrite enabled.	Summit X450-G2, X460-G2, ExtremeSwitching X590	1,024
	Summit X670-G2, X770, ExtremeSwitching X870, X690	512
	ExtremeSwitching X620, X440-G2	256
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, ExtremeSwitching X870	952
	ExtremeSwitching X620, X440-G2	440
	ExtremeSwitching X690, X590	1,976
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, ExtremeSwitching X870	256
	ExtremeSwitching X620, X440-G2	N/A
	ExtremeSwitching X690, X590	512
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, ExtremeSwitching X870	256
	ExtremeSwitching X620, X440-G2	N/A
	ExtremeSwitching X690, X590	512
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, ExtremeSwitching X620, X440-G2, X870	256
	ExtremeSwitching X690, X590	512

Table 4: Supported Limits for Edge License (continued)

Metric	Product	Limit
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, ExtremeSwitching X870	184
	ExtremeSwitching X620, X440-G2	184
	ExtremeSwitching X690, X590	440
Policy-based routing (PBR) redundancy—maximum number of flow-redirects.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	256 [o]
Policy-based routing (PBR) redundancy—maximum number of next hops per each flow-direct.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	32 [o]
Private VLANs—maximum number of subscribers. Assumes a minimum of one port per network and subscriber VLAN.	Summit X770	103
	Summit X670-G2	63
	Summit X460-G2	53
	Summit X450-G2	51
	ExtremeSwitching X440-G2	47
	ExtremeSwitching X620	15
	ExtremeSwitching X870	127
	ExtremeSwitching X690	71
	ExtremeSwitching X590	31
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, ExtremeSwitching X870, X690, X590	1,024
	Summit X450-G2	510
	ExtremeSwitching X440-G2	255
	ExtremeSwitching X620	510
Private VLANs—maximum number of private VLANs in an L2-only environment.	Summit X770, X670-G2, X460-G2, ExtremeSwitching X870, X690, X590	1,280
	Summit X450-G2	597
	ExtremeSwitching X440-G2, X620	255
PTP/1588v2 Clock Ports	Summit X770, X460-G2, X670-G2	32 for boundary clock 1 for ordinary clock
	ExtremeSwitching X440-G2, X620, X870, X690, X590	N/A

Table 4: Supported Limits for Edge License (continued)

Metric	Product	Limit
PTP/1588v2 Clock Instances	Summit X770, X670-G2, X460-G2	2 combinations: • Transparent clock + ordinary clock • Transparent clock + boundary clock
	ExtremeSwitching X440-G2, X620, X870, X690, X590	N/A
PTP/1588v2 Unicast Static Slaves	Summit X770, X670-G2, X460-G2	40 entries per clock port
	ExtremeSwitching X440-G2, X620, X870, X690, X590	N/A
PTP/1588v2 Unicast Static Masters	Summit X770, X670-G2, X460-G2	10 entries per clock type
	ExtremeSwitching X440-G2, X620, X870, X690, X590	N/A
Route policies—suggested maximum number of lines in a route policy file.	Summit X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	10,000
RIP Learned Routes—maximum number of RIP routes supported without aggregation.	Summit X770, X670-G2, X460-G2, and ExtremeSwitching X440-G2, X620, X870, X690, X590	10,000
RIP interfaces on a single router—recommended maximum number of RIP routed interfaces on a switch.	Summit X670-G2, X460-G2, X770, X450-G2, ExtremeSwitching X870, X690, X590	256
	ExtremeSwitching X440-G2, X620	128
RIPng learned routes—maximum number of RIPng routes.	Summit X670-G2, X460-G2, X770, X450-G2, X870, X690, X590	3,000
	ExtremeSwitching X440-G2, X620	N/A
Spanning Tree (maximum STPDs)—maximum number of Spanning Tree Domains on port mode EMISTP.	Summit X450-G2, X770, X670-G2, X460-G2, and ExtremeSwitching X620, X870, X690, X590	64
	ExtremeSwitching X440-G2	32
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 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 would be 16 ports (4,096 ÷ 256).	Summit X770, X670-G2, and ExtremeSwitching X620	256
	Summit X460-G2, X450-G2, and ExtremeSwitching X440-G2	128
	ExtremeSwitching X870, X690, X590	384

Table 4: Supported Limits for Edge License (continued)

Metric	Product	Limit
Spanning Tree—maximum number of multiple spanning tree instances (MSTI) domains.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X870, X690, X590	64
	ExtremeSwitching X440-G2	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.	Summit X770, X670-G2	500
	Summit X460-G2, X450-G2, ExtremeSwitching X620, X870, X690, X590	600
	ExtremeSwitching X440-G2	256
Spanning Tree—maximum number of VLANs on all MSTP instances.	Summit X770, X670-G2, X460-G2, X450-G2, ExtremeSwitching X620, X870, X690, X590	1,024
	ExtremeSwitching X440-G2	512
Spanning Tree (802.1d domains)—maximum number of 802.1d domains per port.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	1
Spanning Tree (number of ports)—maximum number of ports including all Spanning Tree domains.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X870, X690 , X590	4,096
	ExtremeSwitching X440-G2	2,048
Spanning Tree (maximum VLANs)—maximum number of STP-protected VLANs (dot1d and dot1w).	Summit X770, X670-G2, X460-G2, X450-G2, and ExtremeSwitching X620, X870, X690, X590	1,024
	ExtremeSwitching X440-G2	600
SSH (number of sessions)—maximum number of simultaneous SSH sessions.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	8
Static MAC multicast FDB entries—maximum number of permanent multicast MAC entries configured into the FDB.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	1,024
Syslog servers—maximum number of simultaneous Syslog servers that are supported.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	16
Syslog targets—maximum number of configurable Syslog targets.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	16
Telnet (number of sessions)—maximum number of simultaneous Telnet sessions.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	8
Virtual routers—maximum number of user-created virtual routers that can be created on a switch.	Summit X460-G2, X670-G2, X770, X450-G2, ExtremeSwitching X870, X690, X590	63
	ExtremeSwitching X440-G2, X620	16 (local-only VRs)

Table 4: Supported Limits for Edge License (continued)

Metric	Product	Limit
Virtual router forwarding (VRFs)—maximum number of VRFs that can be created on a switch. Note: * Subject to other system limitations.	Summit X460-G2, X670-G2, X770, X450-G2, ExtremeSwitching X870, X690, X590 ExtremeSwitching X440-G2, X620	960 * 16 (local-only VRFs)
Virtual router protocols per VR—maximum number of routing protocols per VR.	Summit X460-G2, X670-G2, X770, X450-G2, ExtremeSwitching X870, X690, X590 ExtremeSwitching X440-G2, X620	8 N/A
Virtual router protocols per switch—maximum number of VR protocols per switch.	Summit X460-G2, X670-G2, X770, X450-G2, ExtremeSwitching X870, X690, X590 ExtremeSwitching X440-G2, X620	64 N/A
VLAN aggregation—maximum number of port-VLAN combinations on any one superVLAN and all of its subVLANs.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	1,000
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.)	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	4,094
VLANs (Layer 2)—maximum number of Layer 2 VLANs.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	4,094
VLANs (Layer 3)—maximum number of VLANs performing IPv4 and/or IPv6 routing. Excludes sub-VLANs.	Summit X460-G2, X770, X670-G2, X450-G2, ExtremeSwitching X870, X690, X590 ExtremeSwitching X440-G2, X620	2,048 510
VLANs (maximum active port-based)—maximum active ports per VLAN when 4,094 VLANs are configured with default license.	Summit X670-G2, ExtremeSwitching X870, X690, X590 ExtremeSwitching X440-G2 Summit X460-G2, X770 ExtremeSwitching X620 Summit X450-G2 Summit X460-G2	32 28 26 16 29 24
VLANs (maximum active protocol-sensitive filters)—number of simultaneously active protocol filters in the switch.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2. X870, X690, X590	16

Table 4: Supported Limits for Edge License (continued)

Metric	Product	Limit
VLAN translation—maximum number of translation VLANs. Assumes a minimum of one port per translation and member VLAN.	Summit X770	103
	Summit X670-G2	63
	Summit X460-G2	53
	Summit X450-G2	51
	ExtremeSwitching X620	15
	ExtremeSwitching X440-G2	47
	ExtremeSwitching X870	127
	ExtremeSwitching X690	71
	ExtremeSwitching X590	31
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 includes tagged and translated ports.	Summit X770, X670-G2, ExtremeSwitching X870, X690, X590	1,024
	Summit X450-G2	512
	ExtremeSwitching X620	510
	ExtremeSwitching X440-G2	255
VLAN translation—maximum number of translation VLAN pairs in an L2-only environment.	Summit X450-G2, X770, X670-G2, X460-G2, ExtremeSwitching X870, X690, X590	2,046
	ExtremeSwitching X440-G2, X620	255
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.	Summit X460-G2, X670-G2, X770, X450-G2, and ExtremeSwitching X440-G2, X620, X870, X690, X590	10 with 100 DACLs
XNV authentication—maximum number of VMs that can be processed (combination of local and network VMs).	Summit X460-G2, X670-G2, X770, ExtremeSwitching X870, X690, X590	2,048
	Summit X450-G2, and ExtremeSwitching X440-G2, X620	1,024
XNV database entries—maximum number of VM database entries (combination of local and network VMs).	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	16,000
XNV database entries—maximum number of VPP database entries (combination of local and network VPPs).	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	2,048
XNV dynamic VLAN—Maximum number of dynamic VLANs created (from VPPs /local VMs).	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	2,048

Table 4: Supported Limits for Edge License (continued)

Metric	Product	Limit
XNV local VPPs—maximum number of XNV local VPPs.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	2,048 ingress 512 egress
XNV policies/dynamic ACLs—maximum number of policies/dynamic ACLs that can be configured per VPP.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	8 ingress 4 egress
XNV network VPPs—maximum number of XNV network VPPs.[p]	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	2,048 ingress 512 egress

Supported Limits for Advanced Edge License

The following table shows supported limits for features in the Advanced Edge License.

Table 5: Supported Limits for Advanced Edge License

Metric	Product	Limit
BGP auto-peering—maximum number of auto-peering nodes and VTEPs.	Summit X670-G2, X770, ExtremeSwitching X690, X870, X590	64
BGP auto-peering attached IPv4 hosts— maximum number of attached IPv4 hosts.	Summit X670-G2, X770 ExtremeSwitching X870, X690, X590	16,000 64,000
BGP auto-peering attached IPv6 hosts— maximum number of attached IPv6 hosts.	Summit X670-G2, X770 ExtremeSwitching X870, X690, X590	254 8,000
BGP auto-peering ECMP—maximum number equal cost multipath for auto-peering. Note: * Subject to the limitation imposed by the number of physical ports on a switch.	Summit X670-G2, X770, ExtremeSwitching X690, X870, X590	16*
BGP auto-peering maximum IPv4 prefixes with ECMP—Maximum number of IPv4 Network prefixes with ECMP.	Summit X670-G2, X770, ExtremeSwitching X690, X870, X590	64,000
BGP auto-peering maximum IPv6 prefixes with ECMP—Maximum number of IPv6 Network prefixes with ECMP.	Summit X670-G2, X770, ExtremeSwitching X690, X870, X590	8,000
BGP auto-peering MLAG peers—maximum MLAG peers per AutoBGP node.	Summit X670-G2, X770, ExtremeSwitching X690, X870, X590	1
BGP auto-peering VRFs—maximum number of VRFs.	Summit X670-G2, X770, ExtremeSwitching X690, X870, X590	64

Table 5: Supported Limits for Advanced Edge License (continued)

Metric	Product	Limit
BGP auto-peering EVPN instances—maximum EVPN instances.	Summit X670-G2, X770, ExtremeSwitching X690, X870, X590	4,096
BGP auto-peering asymmetrical routing tenant VLANs—maximum number of tenant VLANs supporting asymmetric routing.	Summit X670-G2, X770, ExtremeSwitching X690, X870, X590	1,024
EAPS domains—maximum number of EAPS domains. Note: An EAPS ring that is being spatially reused cannot have more than four configured EAPS domains.	ExtremeSwitching X870, X690, X590	128
	Summit X670-G2, X450-G2, X460-G2, X770	64
	ExtremeSwitching X440-G2, X620	32
EAPSv2 protected VLANs—maximum number of protected VLANs.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X440-G2, X620	500
	ExtremeSwitching X870, X690, X590	2,000
ERPS domains—maximum number of ERPS domains without CFM configured.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	32
ERPS domains—maximum number of ERPS domains with CFM configured.	Summit X450-G2, X670-G2, X770, and ExtremeSwitching X620, X870, X690, X590	16
	Summit X460-G2	32
ERPSv1 protected VLANs—maximum number of protected VLANs.	Summit X450-G2, X460-G2, X670-G2, and ExtremeSwitching X870, X690, X590	2,000
	Summit X770, ExtremeSwitching X620, X440-G2	1,000
ERPSv2 protected VLANs—maximum number of protected VLANs.	Summit X450-G2, X460-G2, X670-G2, and ExtremeSwitching X870, X690, X590	2,000
	Summit X770, ExtremeSwitching X620, X440-G2	500
ESRP groups—maximum number of ESRP groups	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X440-G2, X620, X870, X690, X590	32
ESRP domains—maximum number of ESRP domains.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	64
ESRP L2 VLANs—maximum number of ESRP VLANs without an IP address configured.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	1,000

Table 5: Supported Limits for Advanced Edge License (continued)

Metric	Product	Limit
ESRP L3 VLANs—maximum number of ESRP VLANs with an IP address configured.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	511
ESRP (maximum ping tracks)—maximum number of ping tracks per VLAN.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	8
ESRP (IP route tracks)—maximum IP route tracks per VLAN.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	8
ESRP (VLAN tracks)—maximum number of VLAN tracks per VLAN.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	1
OSPFv2/v3 ECMP—maximum number of equal cost multipath OSPFv2 and OSPFv3.	Summit X460-G2, X670-G2, X770, X450-G2, ExtremeSwitching X870, X690, X590	64
	ExtremeSwitching X620	4
	ExtremeSwitching X440-G2	N/A
OSPFv2 areas—as an ABR, how many OSPF areas are supported within the same switch.	Summit X460-G2, X670-G2, X770, ExtremeSwitching X870, X690, X590	8
	Summit X450-G2, ExtremeSwitching X440-G2, X620	4
OSPFv2 external routes—recommended maximum number of external routes contained in an OSPF LSDB.	ExtremeSwitching X870, X690, X590	10,000
	Summit X770, X670-G2, X460-G2	5,000
	Summit X450-G2, ExtremeSwitching X440-G2, X620	2,400
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.	ExtremeSwitching X870, X690, X590	4,000
	Summit X670-G2, X460-G2, X770	2,000
	Summit X450-G2, and ExtremeSwitching X440-G2, X620	1,000
OSPFv2 interfaces—recommended maximum number of OSPF interfaces on a switch (active interfaces only).	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	4
OSPFv2 links—maximum number of links in the router LSA.	Summit X460-G2, X670-G2, ExtremeSwitching X870, X690, X590	400
	Summit X450-G2, and ExtremeSwitching X620, X440-G2	4
	Summit X770	419

Table 5: Supported Limits for Advanced Edge License (continued)

Metric	Product	Limit
OSPFv2 neighbors—maximum number of supported OSPF adjacencies.	Summit X450-G2, X770, X670-G2, X460-G2, and ExtremeSwitching X440-G2, X620, X870, X690, X590	4
OSPFv2 routers in a single area—recommended maximum number of routers in a single OSPF area.	ExtremeSwitching X870, X690, X590	100
	Summit X770, X670-G2, X460-G2	50
	Summit X450-G2, ExtremeSwitching X440-G2, X620	4
OSPFv2 virtual links—maximum number of supported OSPF virtual links.	Summit X460-G2, X670-G2, X770, ExtremeSwitching X870, X690, X590	32
	Summit X450-G2, and ExtremeSwitching X440-G2, X620	4
OSPFv3 areas—as an ABR, the maximum number of supported OSPFv3 areas.	ExtremeSwitching X870, X690, X590	100
	Summit X460-G2, X670-G2, X770	16
	Summit X450-G2, ExtremeSwitching X440-G2, X620	4
OSPFv3 external routes—recommended maximum number of external routes.	Summit X770, X670-G2, X460-G2, ExtremeSwitching X870, X690, X590	10,000
	Summit X450-G2, ExtremeSwitching X440-G2, X620	1,200
OSPFv3 inter- or intra-area routes—recommended maximum number of inter- or intra-area routes.	ExtremeSwitching X870, X690, X590	4.000
	Summit X770, X670-G2, X460-G2	3,000
	Summit X450-G2, ExtremeSwitching X440-G2, X620	500
OSPFv3 interfaces—maximum number of OSPFv3 interfaces.	Summit X770, X670-G2, X460-G2, X450-G2, ExtremeSwitching X870, X690, X440-G2, X620, X590	4
OSPFv3 neighbors—maximum number of OSPFv3 neighbors.	Summit X450-G2, X770, X670-G2, X460-G2, ExtremeSwitching X870, X690, X440-G2, X620, X590	4
OSPFv3 virtual links—maximum number of OSPFv3 virtual links supported.	Summit X770, X670-G2, X460-G2, ExtremeSwitching X870, X690, X590	16
	Summit X450-G2, ExtremeSwitching X440-G2, X620	4
OVSDB Manager Connections—Maximum number of connections to managers that can be configured (either of TCP, PTCP, SSL, or PSSL).	Summit X770, X670-G2, ExtremeSwitching X870, X690, X590	8
	Smmit X450-G2	N/A

Table 5: Supported Limits for Advanced Edge License (continued)

Metric	Product	Limit
OVSDB Managed Switches—Maximum number of OVSDB-managed switches.	Summit X770, X670-G2, ExtremeSwitching X870, X690, X590 Smmit X450-G2	1 N/A
PIM IPv4 (maximum interfaces)—maximum number of PIM active interfaces.	Summit X460-G2, X670-G2, X770, X450-G2, ExtremeSwitching X870, X440-G2, X620, X690, X590	4
PIM IPv4 Limits—maximum number of multicast groups per dynamic rendezvous point.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	180
PIM IPv4 Limits—maximum number of multicast groups per static rendezvous point.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	3,000 (depends on policy file limits)
PIM IPv4 Limits—maximum number of multicast sources per group.	Summit X460-G2, X670-G2, X770, X450-G2, ExtremeSwitching X870, X690, X590 ExtremeSwitching X440-G2, X620	5,000 1,500
PIM IPv4 Limits—maximum number of dynamic rendezvous points per multicast group.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	145
PIM IPv4 Limits—static rendezvous points.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	32
PIM IPv6 (maximum interfaces)—maximum number of PIM active interfaces.	Summit X460-G2, X670-G2, X770, X450-G2, ExtremeSwitching X870, X440-G2, X620, X690, X590	4
PIM IPv6 Limits—maximum number of multicast sources per group.	Summit X460-G2, X670-G2, X770, ExtremeSwitching X870, X690, X590 Summit X450-G2 ExtremeSwitching X440-G2, X620	1,750 1,500 550
PIM IPv6 Limits—maximum number of multicast groups per dynamic rendezvous point.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	70
PIM IPv6 Limits—maximum number of multicast groups per static rendezvous point.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	3,000 (depends on policy file limits)
PIM IPv6 Limits—maximum number of dynamic rendezvous points per multicast group.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	64
PIM IPv6 Limits—maximum number of secondary address per interface.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	70

Table 5: Supported Limits for Advanced Edge License (continued)

Metric	Product	Limit
PIM IPv6 Limits—static rendezvous points.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	32
Port-specific VLAN tags—maximum number of port-specific VLAN tags.	Summit X460-G2, X670-G2, X770, ExtremeSwitching X870, X690, X590	1,023
	Summit X450-G2, and ExtremeSwitching X440-G2, X620	N/A
Port-specific VLAN tags—maximum number of port-specific VLAN tag ports.	Summit X770, X670-G2	6,400
	Summit X460-G2, ExtremeSwitching X870, X690, X590	4,000
	Summit X450-G2, and ExtremeSwitching X440-G2, X620	N/A
VRRP (v2/v3-IPv4) (maximum instances)—maximum number of VRRP instances for a single switch, with Advanced Edge license or higher. Note: These limits are applicable for Fabric Routing configuration also. Note: Number of groups configured should not exceed the number of individual VRs supported (that is, in normal mode) for that platform type.	Normal Mode (as individual VRs):	
	Summit X770, X670-G2, X460-G2, X450-G2, and ExtremeSwitching X870, X690, X590	511
	ExtremeSwitching X440-G2, X620	128
	Scaled Mode (with groups):	
	Summit X770, X670-G2, X460-G2, X450-G2, and ExtremeSwitching X870, X690, X590	2,048
	ExtremeSwitching X440-G2, X620	128
VRRP (v3-IPv6) (maximum instances)—maximum number of VRRP instances for a single switch, with Advanced Edge license or higher. (VRRP-VRRPv3-IPv6) Note: These limits are applicable for Fabric Routing configuration also. Note: Number of groups configured should not exceed the number of individual VRs supported (that is, in normal mode) for that platform type.	Normal Mode (as individual VRs):	
	Summit X770, X670-G2, X460-G2, X450-G2, and ExtremeSwitching X870, X690, X590	511
	ExtremeSwitching X440-G2, X620	128
	Scaled Mode (with groups):	
	Summit X770, X670-G2, X460-G2, X450-G2, and ExtremeSwitching X870, X690, X590	2,048
	ExtremeSwitching X440-G2, X620	128
VRRP (v2/v3-IPv4/IPv6) (maximum VRID)—maximum number of unique VRID numbers per switch.	Summit X770, X670-G2, X460-G2, X450-G2 and ExtremeSwitching X440-G2, X620, X870, X690, X590 Note: With Advanced Edge license or higher.	255

Table 5: Supported Limits for Advanced Edge License (continued)

Metric	Product	Limit
VRRP (v2/v3-IPv4/IPv6) (maximum VRIDs per VLAN)—maximum number of VRIDs per VLAN.	Summit X770, X670-G2, X460-G2, X450-G2 and ExtremeSwitching X440-G2, X620, X870, X690, X590 Note: With Advanced Edge license or higher.	255
VRRP (v2/v3-IPv4/IPv6) (maximum ping tracks)—maximum number of ping tracks per VLAN.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590 Note: With Advanced Edge license or higher.	8
VRRP (maximum ping tracks)—maximum number of ping tracks per VRRP Instance under 128 VRRP instances, with Advanced Edge license or higher.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	8 (20 centisecond or 1 second hello interval)
VRRP (v3-IPv6) (maximum ping tracks)—maximum number of ping tracks per VRRP Instance under 128 VRRP instances, with Advanced Edge license or higher.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	8 (20 centisecond or 1 second hello interval)
VRRP (v2/v3-IPv4/IPv6) (maximum iproute tracks)—maximum number of IP route tracks per VLAN.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	8
VRRP (v2/v3-IPv4/IPv6)—maximum number of VLAN tracks per VLAN.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X620, X440-G2, X870, X690, X590	8
VXLAN—maximum virtual networks. Note: Every VPLS instance/PSTag VLAN reduces this limit by 1. Note: Assumption is all BUM (broadcast/unknown-unicast/multicast) FDB entries are pointing to the same set of RTEPs when all VNETs use explicit flooding. Depends on whether all VNETs use standard or explicit and the number of tenant VLAN ports.	Summit X670-G2, X770, and ExtremeSwiching X870, X690, X590 Summit X460-G2, X450-G2, and ExtremeSwitching X440-G2, X620	2,048–4,000 N/A
VXLAN—maximum tenant VLANs plus port combinations Note: Every (VPLS/PSTag VLAN) + port reduces the limit by 1.	Summit X670-G2, X770, and ExtremeSwiching X870, X690, X590 Summit X460-G2, X450-G2, and ExtremeSwitching X440-G2, X620	4,096 N/A

Table 5: Supported Limits for Advanced Edge License (continued)

Metric	Product	Limit
VXLAN—maximum static MAC to IP bindings. Note: Every FDB entry configured reduces this limit by 1.	Summit X670-G2, X770, and ExtremeSwiching X870, X690, X590 Summit X460-G2, X450-G2, and ExtremeSwitching X440-G2, X620	64,000 N/A
VXLAN—maximum RTEP IP addresses	Summit X670-G2, X770, and ExtremeSwitching X870, X690, X590 Summit X460-G2, X450-G2, and ExtremeSwitching X440-G2, X620	512 N/A
VXLAN—maximum virtual networks with dynamic learning and OSPF extensions for VXLAN	Summit X670-G2, X770, and ExtremeSwitching X870, X690, X590 Summit X460-G2, X450-G2, and ExtremeSwitching X440-G2, X620	4,000 N/A

Supported Limits for Core License

The following table shows supported limits for features in the Core License.

Table 6: Supported Limits for Core License

Metric	Product	Limit
BGP (aggregates)—maximum number of BGP aggregates.	Summit X460-G2, X670-G2, X770, ExtremeSwitching X870, X690, X590 Summit X450-G2	256 204
BGP (networks)—maximum number of BGP networks.	Summit X460-G2, X670-G2, X770, ExtremeSwitching X870, X690, X590 Summit X450-G2	1,024 820
BGP (peers)—maximum number of BGP peers. Note: With default keepalive and hold timers.	Summit X460-G2, X670-G2, X770, ExtremeSwitching X870 ExtremeSwitching X690, X590 Summit X450-G2	128 300 100
BGP (peer groups)—maximum number of BGP peer groups.	Summit X460-G2, X670-G2, X770, ExtremeSwitching X870, X690, X590 Summit X450-G2	64 50
BGP (policy entries)—maximum number of BGP policy entries per route policy.	Summit X460-G2, X670-G2, X770, ExtremeSwitching X870, X690, X590 Summit X450-G2	256 204

Table 6: Supported Limits for Core License (continued)

Metric	Product	Limit
BGP (policy statements)—maximum number of BGP policy statements per route policy.	Summit X460-G2, X670-G2, X770, ExtremeSwitching X870, X690, X590	1,024
	Summit X450-G2	820
BGP multicast address-family routes—maximum number of multicast address-family routes.	Summit X460-G2, X670-G2, X770, and ExtremeSwitching X870, X690, X590	25,000
	Summit X450-G2	20,000
BGP (unicast address-family routes)—maximum number of unicast address-family routes.	Summit X460-G2, X670-G2, X770, ExtremeSwitching X870, X690, X590 (at default)	25,000
	ExtremeSwitching X870, X690, X590 (with ALPM enabled)	100,000
	Summit X450-G2	20,000
BGP (non-unique routes)—maximum number of non-unique BGP routes.	Summit X460-G2, X670-G2, X770, ExtremeSwitching X870, X690, X590	25,000
	Summit X450-G2	20,000
BGP ECMP—maximum number of equal cost multipath for BGP and BGPv6.	Summit X460-G2, X670-G2, X770, ExtremeSwitching X870, X690, X590	2, 4, 8, 16, 32, or 64
	Summit X450-G2	64
BGPv6 (unicast address-family routes)—maximum number of unicast address family routes.	Summit X460-G2	6,000
	Summit X670-G2, X770	8,000
	ExtremeSwitching X870, X690, X590	10,000
	ExtremeSwitching X870, X690 (with ALPM enabled)	100,000
	Summit X450-G2	4,800
BGPv6 (non-unique routes)—maximum number of non-unique BGP routes.	Summit X460-G2	18,000
	Summit X670-G2, X770, ExtremeSwitching X870, X690, X590	24,000
	Summit X450-G2	14,000
GRE Tunnels—maximum number of GRE tunnels.	Summit X460-G2, X670-G2, X770, X450-G2, and ExtremeSwitching X870, X690, X590	255
	ExtremeSwitching X620, X440G2	N/A

Table 6: Supported Limits for Core License (continued)

Metric	Product	Limit
IS-IS adjacencies—maximum number of supported IS-IS adjacencies.	Summit X460-G2, X670-G2, X770, and ExtremeSwitching X870, X690, X590	128
	Summit X450-G2	N/A
IS-IS ECMP—maximum number of equal cost multipath for IS-IS.	Summit X460-G2, X670-G2, X770, and ExtremeSwitching X870, X690, X590	2, 4, or 8
	Summit X450-G2	N/A
IS-IS interfaces—maximum number of interfaces that can support IS-IS.	Summit X460-G2, X670-G2, X770, and ExtremeSwitching X870, X690, X590	255
	Summit X450-G2	N/A
IS-IS routers in an area—recommended maximum number of IS-IS routers in an area.	Summit X460-G2, X670-G2, X770, and ExtremeSwitching X870, X690, X590	256
	Summit X450-G2	N/A
IS-IS route origination—recommended maximum number of routes that can be originated by an IS-IS node.	Summit X460-G2, X670-G2, X770, and ExtremeSwitching X870, X690, X590	20,000
	Summit X450-G2	N/A
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.	Summit X460-G2, X670-G2, X770, and ExtremeSwitching X870, X690, X590	25,000
	Summit X450-G2	N/A
IS-IS IPv4 L2 routes—recommended maximum number of IS-IS Level 2 routes.	Summit X460-G2, X670-G2, X770, and ExtremeSwitching X870, X690, X590	25,000
	Summit X450-G2	N/A
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.	Summit X460-G2, X670-G2, X770, and ExtremeSwitching X870, X690, X590	20,000
	Summit X450-G2	N/A
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.	Summit X460-G2, X670-G2, X770, and ExtremeSwitching X870, X690, X590	10,000
	Summit X450-G2	N/A
IS-IS IPv6 L2 routes—recommended maximum number of IS-IS Level 2 routes.	Summit X460-G2, X670-G2, X770, and ExtremeSwitching X870, X690, X590	10,000
	Summit X450-G2	N/A

Table 6: Supported Limits for Core License (continued)

Metric	Product	Limit
IS-IS IPv6 L1 routes in an L1/L2 router—recommended maximum number of IS-IS Level 1 routes in a L1/l2 router.	Summit X460-G2, X670-G2, X770, and ExtremeSwitching X870, X690, X590	10,000
	Summit X450-G2	N/A
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.	Summit X460-G2, X670-G2, X770, and ExtremeSwitching X870, X690, X590	20,000
	Summit X450-G2	N/A
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.	Summit X460-G2, X670-G2, X770, and ExtremeSwitching X870, X690, X590	20,000
	Summit X450-G2	N/A
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.	Summit X460-G2, X670-G2, X770, and ExtremeSwitching X870, X690, X590	20,000
	Summit X450-G2	N/A
MSDP active peers—maximum number of active MSDP peers.	Summit X450-G2, X770, X670-G2, X460-G2, ExtremeSwitching X870, X690, X590	64
MSDP SA cache entries—maximum number of entries in SA cache.	Summit X670-G2, X770, ExtremeSwitching X690, X590	14,000
	Summit X460-G2	10,000
	ExtremeSwitching X870	11,000
	Summit X450-G2	8,000
MSDP maximum mesh groups—maximum number of MSDP mesh groups.	Summit X450-G2, X770, X670-G2, X460-G2, ExtremeSwitching X870, X690, X590	16
OSPFv2/v3 ECMP—maximum number of equal cost multipath OSPFv2 and OSPFv3.	Summit X460-G2, X670-G2, X770, X450-G2, ExtremeSwitching X870, X690, X590	64
OSPFv2 areas—as an ABR, how many OSPF areas are supported within the same switch.	Summit X450-G2, X460-G2, X670-G2, X770, ExtremeSwitching X870, X690, X590	8
OSPFv2 external routes—recommended maximum number of external routes contained in an OSPF LSDB.	ExtremeSwitching X870, X690, X590	10,000
	Summit X770, X670-G2, X460-G2	5,000
	Summit X450-G2	4,000

Table 6: Supported Limits for Core License (continued)

Metric	Product	Limit
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.	ExtremeSwitching X870, X690, X590	4,000
	Summit X670-G2, X460-G2, X770	2,000
	Summit X450-G2	1,600
OSPFv2 interfaces—recommended maximum number of OSPF interfaces on a switch (active interfaces only).	Summit X460-G2, X670-G2, X770, ExtremeSwitching X870, X690, X590	400
	Summit X450-G2	320
OSPFv2 links—maximum number of links in the router LSA.	Summit X460-G2, X670-G2, ExtremeSwitching X870, X690, X590	400
	Summit X770	419
	Summit X450-G2	320
OSPFv2 neighbors—maximum number of supported OSPF adjacencies.	Summit X770, X670-G2, X460-G2, ExtremeSwitching X870, X690, X590	128
	Summit X450-G2	96
OSPFv2 routers in a single area—recommended maximum number of routers in a single OSPF area.	ExtremeSwitching X870, X690, X590	100
	Summit X770, X670-G2, X460-G2	50
	Summit X450-G2	40
OSPFv2 virtual links—maximum number of supported OSPF virtual links.	Summit X460-G2, X670-G2, X770, ExtremeSwitching X870, X690 , X590	32
	Summit X450-G2	25
OSPFv3 areas—as an ABR, the maximum number of supported OSPFv3 areas.	ExtremeSwitching X870, X690, X590	100
	Summit X460-G2, X670-G2, X770	16
	Summit X450-G2	12
OSPFv3 external routes—recommended maximum number of external routes.	Summit X770, X670-G2, X460-G2, ExtremeSwitching X870, X690, X590	10,000
	Summit X450-G2	7,500
OSPFv3 inter- or intra-area routes—recommended maximum number of inter- or intra-area routes.	ExtremeSwitching X870, X690, X590	4.000
	Summit X770, X670-G2, X460-G2	3,000
	Summit X450-G2	500

Table 6: Supported Limits for Core License (continued)

Metric	Product	Limit
OSPFv3 interfaces—maximum number of OSPFv3 interfaces.	Summit X770	128
	Summit X670-G2, X460-G2, ExtremeSwitching X870, X690, X590	256
	Summit X450-G2	192
OSPFv3 neighbors—maximum number of OSPFv3 neighbors.	Summit X770, X670-G2, X460-G2, ExtremeSwitching X870, X690, X590	64
	Summit X450-G2	48
OSPFv3 virtual links—maximum number of OSPFv3 virtual links supported.	Summit X770, X670-G2, X460-G2, ExtremeSwitching X870, X690, X590	16
	Summit X450-G2	12
PIM IPv4 (maximum interfaces)—maximum number of PIM active interfaces.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X870, X690, X590	512
PIM IPv4 Limits—maximum number of multicast groups per dynamic rendezvous point.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X870, X690, X590	180
PIM IPv4 Limits—maximum number of multicast groups per static rendezvous point.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X870, X690, X590	3,000 (depends on policy file limits)
PIM IPv4 Limits—maximum number of multicast sources per group.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X870, X690, X590	5,000
PIM IPv4 Limits—maximum number of dynamic rendezvous points per multicast group.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X870, X690, X590	145
PIM IPv4 Limits—static rendezvous points.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X870, X690, X590	32
PIM IPv6 (maximum interfaces)—maximum number of PIM active interfaces.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X870, X690, X590	512
PIM IPv6 Limits—maximum number of multicast sources per group.	Summit X460-G2, X670-G2, X770, and ExtremeSwitching X870, X690, X590	2,500
	Summit X450-G2,	1,500
PIM IPv6 Limits—maximum number of multicast groups per dynamic rendezvous point.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X870, X690, X590	70
PIM IPv6 Limits—maximum number of multicast groups per static rendezvous point.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X870, X690, X590	3,000 (depends on policy file limits)

Table 6: Supported Limits for Core License (continued)

Metric	Product	Limit
PIM IPv6 Limits—maximum number of dynamic rendezvous points per multicast group.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X870, X690, X590	64
PIM IPv6 Limits—maximum number of secondary address per interface.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X870, X690, X590	70
PIM IPv6 Limits—static rendezvous points.	Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X870, X690, X590	32

[a] The table shows the total available. When installing ACL rules bound to a set of ports, rules are replicated for each port if there are ACL counters and counter compression is not enabled or if the ports are Extended Edge Switching extended ports.
[c] When there are BFD sessions with minimal timer, sessions with default timer should not be used.
[f] Effective capacity varies based on actual MAC addresses and VLAN IDs used and hash algorithm selected.
[g] Based on "configure forwarding internal-tables more l2".
[h] Based on "configure forwarding internal-tables more l3-and-ipmc".
[j] The limit depends on setting configured with configure iproute reserved-entries.
[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] The 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.
[q] Based on "configure forwarding internal-tables more routes".
[r] Based on `configure forwarding internal-tables more routes ipv6-mask-length 128`.

3 Open Issues, Known Behaviors, and Resolved Issues

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 22.6.1-Patch1-8.

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

CR Number	Description
ExtremeSwitching X620 Series Switches	
xos0072580	For ExtremeSwitching X620 series switches, after applying policy configuration changes with `disable policy` and `enable policy` on a LAG master port that is in down state, NetLogin authentication may fail on the port. Workaround: Run the command `clear netlogin` **`state port`** *`LAG master port`* to reinstate NetLogin on the port.
BGP Auto-peering	
xos0072783	VLAN process ends unexpectedly when disabling all remote VXLAN tunnel end points using the command `disable virtual-network remote-endpoint vxlan all`.
Extended Edge Switching	

xos0072443	With mirroring configuration, the following error appears when rebooting 1st tier bridge port extender (BPE) in an Extended Edge Switching topology:
	
	`<Erro:HAL.Mirror.Error> Slot-1: Failed to add mirroring source 162:1 on unit 0, Invalid port`
	`<Erro:HAL.Mirror.Error> Slot-1: Failed to add mirroring source 161:1 on unit 0, Invalid port`

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

CR Number	Description

xos0072839	In a topology with redundant controlling bridges (CBs) with attached MLAG'd bridge port extenders (BPEs) connected on regular ports, and a non-MLAG'd BPE that is connected on a 40G port, if you perform the following steps:
	1 Unconfigure the CBs to trigger Extended Edge Switching full automation.
	2 Configure port partition on the 40G port (4 × 10G).
	3 Reboot the CB with the non-MLAG'd BPE.
	4 Enable auto-configuration, if required.
	The non-MLAG BPE remains in the booting state and times out with the error similar to the following:
	`08/16/2018 22:05:14.65 <Erro:STP.InBPDU.Drop> Slot-1: Port=1:15: No associated STP port for STP Domain tag 1 (Rate-limited)`
	`08/16/2018 22:05:24.14 <Info:HAL.Card.Info> Slot-1: Unable to get MLAG Peer CB & BPE info for slot 116`
	`08/16/2018 22:05:26.15 <Info:HAL.Card.Info> Slot-1: Unable to get MLAG Peer CB & BPE info for slot 117`
	`08/16/2018 22:05:26.66 <Erro:STP.InBPDU.Drop> Slot-1: Port=115:8: No associated STP port for STP Domain tag 1 (Rate-limited)`
	`08/16/2018 22:05`
	`08/16/2018 21:23:59.49 <Erro:STP.InBPDU.Drop> Slot-1: Previous message repeated 14 additional times in the last 13 second(s)`
	`08/16/2018 21:23:59.19 <Erro:DM.Error> Slot-1: Skipping set_card_state(117, POWERON) as card state is UNKNOWN instead of FAILED`
	`08/16/2018 21:23:58.62 <Erro:STP.InBPDU.Drop> Slot-1: Port=115:8: dropping PDU as MLAG masterStatus not ready yet`
	`08/16/2018 21:23:57.44 <Erro:STP.InBPDU.Drop> Slot-1: Port=115:8: dropping PDU as MLAG masterStatus not ready yet`
	`08/16/2018 21:23:57.18 <Info:HAL.Card.Info> Slot-1: Slot-117 down, resetting all TCP connections to it`
	`08/16/2018 21:23:57.18 <Info:HAL.Card.Info> Slot-1: Module in Slot-117 is removed`
	`08/16/2018 21:23:57.16 <Erro:DM.Error> Slot-1: Skipping set_card_state(116, POWERON) as card state is UNKNOWN instead of FAILED`
	`08/16/2018 21:23:56.65 <Erro:STP.InBPDU.Drop> Slot-1: Port=115:8: dropping PDU as MLAG masterStatus not ready yet`
	`08/16/2018 21:23:56.15 <Warn:DM.Warning> Slot-1: Slot-117 FAILED (1) CardExec (state BOOTING) timed out`
	`08/16/2018 21:23:56.15 <Warn:DM.Warning> Slot-1: Slot-117 Timeout in State BOOTING`
	`08/16/2018 21:23:55.46 <Erro:STP.InBPDU.Drop> Slot-1: Port=115:8: dropping PDU as MLAG masterStatus not ready yet`

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

CR Number	Description
xos0072936	When using Extended Edge Switching full automation with multiple controlling bridge (CB) MLAG peer candidates, automation stops (as designed), but displays errors due to clean-up effort that involves deleting non-existent VLANs. **Workaround:** Have only one CB MLAG candidate connected when using full automation, or use partial-automation (have configuration on the CB, configure MLAG peer, and then issue the command `enable vpex auto-configuration`.
Diagnostics	
xos0072841	Operational diagnostics version 3.0 for ONIE series switches (released with ExtremeXOS 22.6) may fail to run due to a hardware watchdog expiration prior to the diagnostics application taking over the watchdog. Since the 3.0 version of diagnostics is only required for ExtremeSwitching X590 series switches, you can leave the previous version 2.6 installed on ExtremeSwitching X870 or X690 series switches and continue to use that version. **Workaround:** For installations that are already upgraded to 3.0 using the 22.6 diagnostics XMOD, and see this issue, two workarounds are possible: • Run diagnostics and monitor progress. If diagnostics reboots the switch before running, the watchdog is disabled after reboot, and the switch reboots to the GRUB menu. Manually select primary or secondary diagnostics from the GRUB menu to run the operational diagnostics. • Power cycle the switch and select primary or secondary diagnostics from the GRUB menu instead of EXOS. Diagnostics run before ExtremeXOS can enable the watchdog function.
NetLogin	
xos0070151	Profile changes made through Change of Authorization (CoA) are applied to the authenticator, but not to remote peer using NetLogin and MLAG, so that the peer entry remains in the old profile. **Workaround:** Use SNMP instead of CoA with Captive Portal feature.
Optics	
xos0072483	ExtremeSwitching X690, X870 and X590 series switches do not support 100G Optic/AOC cables on stacking ports.
VXLAN	
xos0072043	On an unconfigured switch, adding a static route by a VXLAN tunnel with traffic flowing may cause a warning message in the log. The condition is harmless and can be ignored. There will be about a dozen messages in the log, with the main identifying message being similar to: `WARNING: CPU: 0 PID: <XYZ> at kernel/softirq.c:146 __local_bh_enable_ip+0x7a/0xa0()` **Workaround:** Save the configuration, and then reboot.

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

CR Number	Description
xos0071205	On Summit X670-G2 and X770 series switches, when using scripts to issue OSPF commands, OSPF takes longer to arrive, and stay, in full state with 2K virtual networks after rebooting.
xos0071204	On Summit X670-G2 and X770 series switches, when creating/discovering a large number of VXLAN remote termination endpoints (RTEPs), the start of forwarding of broadcast traffic might be delayed.

Known Behaviors

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

Table 8: Known Issues, Platform-Specific, and Feature Change Requests (CRs)

CR Number	Description
General	
xos0061255	With tunnel present, IPv6 traffic does not resume forwarding after clearing FDB. Workaround: Explicitly ping the local IPv6 host before sending tunnel traffic.

Resolved Issues in ExtremeXOS 22.6.1-Patch1-8

The following issues were resolved in ExtremeXOS 22.6.1-Patch1-8. ExtremeXOS 22.6.1-Patch1-8 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 21.1, ExtremeXOS 22.1, ExtremeXOS 22.2, ExtremeXOS 22.3, ExtremeXOS 22.4, ExtremeXOS 22.5, and ExtremeXOS 22.6. 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 22.6.1-Patch1-8

CR Number	Description
Stacking	
xos0073619	If a slot containing a LAG member port is powered down, then that traffic initially forwarded through the LAG member port may be dropped for up to 20 seconds.
xos0073909	Multicast-related error log messages appear when there is a continuous multicast traffic.
xos0074544	Downloading ExtremeXOS image to backup/standby node in a stack fails due to TFTP block number limitation.

Table 9: Resolved Issues, Platform-Specific, and Feature Change Requests (CRs) in 22.6.1-Patch1-8 (continued)

CR Number	Description
xos0074672	Unable to connect a new switch to the ExtremeCloud due to a SSL certificate exchange error.
xos0074308	Image download fails if the URL size limit is greater than 128 characters.
xos0074378	The process PoE stops responding on the controlling bridge (CB) when polling the PoE configuration periodically from ExtremeManagement (cloud connector).
xos0074474	HAL process ends unexpectedly with signal 11 when native cascade port is physically swapped a few times with cloud connector enabled.

Resolved Issues in ExtremeXOS 22.6.1-Patch1-1

The following issues were resolved in ExtremeXOS 22.6.1-Patch1-1. ExtremeXOS 22.6.1-Patch1-1 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 21.1, ExtremeXOS 22.1, ExtremeXOS 22.2, ExtremeXOS 22.3, ExtremeXOS 22.4, ExtremeXOS 22.5, and ExtremeXOS 22.6. 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 22.6.1-Patch1-1

CR Number	Description
Stacking	
xos0073370	ExtremeSwitching X440-G2 and X620 series switches are not stable when used in a stack.

Resolved Issues in ExtremeXOS 22.6

The following issues were resolved in ExtremeXOS 22.6. ExtremeXOS 22.5 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 21.1, ExtremeXOS 22.1, ExtremeXOS 22.2, ExtremeXOS 22.3, ExtremeXOS 22.4, and ExtremeXOS 22.5. 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 22.6

CR Number	Description
Summit X460-G2 Series Switches	
xos0070774	On Summit X460-G2 series switches, packets are not transmitted out of the VIM-2t or VIM-2x ports configured for 1G speed after rebooting.
ExtremeSwitching X690 Series Switches	
xos0071292	Mirroring does not work on ExtremeSwitching X690 series switches when an optic is inserted into the intended mirroring port, port is configured as 'mirror-to', and then cable is inserted into the port.
xos0071325	Multicast packets with TTL value 1 traffic is flooded on ExtremeSwitching X690 series switches.
xos0071996	On ExtremeSwitching X690 series switches, need to be able to program in Extended View IP adjacencies learned on VXLAN tunnels.
xos0072069	A Few L3VPN routes are not reachable after several LSP flap events.
xos0070629	When auto-peering is enabled, disabling the network port over which a VXLAN tunnel egresses may cause the error "exvlan: configPortLearningState..." to appear.
xos0072619	On ExtremeSwitching X690 series switches with Extended Edge Switching topology, when using Captive Portal with a high load of simultaneous incoming new users, crashes can occur.
xos0072695	The following EMS log message may occur if a large number of ECMP routes whose nexthops are reachable using a VXLAN tunnel transition to non-ECMP routes: `<Warn:Card.IPv4FIB.LPMTblAlrdyEmpty> Number of IPv4 routes in LPM table is already 0.`
ExtremeSwitching X440-G2 Series Switches	
xos0072030	The output of the `show power` command shows a random, impossible value for the power usage for ExtremeSwitching X440-G2 series switches.
xos0072408	10G combo ports lose connection after applying quad 10G license.
General	
xos0061504	Port-based sharing algorithm incorrectly allows adding greater than 16 member ports in a single group. The maximum number of member ports in single group should be 16.
xos0066243	The `eject memorycard` command does not properly disconnect memory cards (USB drives) when executed while downloading files by TFTP.
xos0071222	Need a mechanism to suppress generation of IGMP-triggered queries when receiving STP topology changes.
xos0071387	In the *ExtremeXOS User Guide Routing Policies* chapter, a note regarding "tag" match condition needs to be updated.
xos0071430	XMLC process ends unexpectedly with signal 6 randomly when deleting xml-notification target.
xos0071450	In the output of `show ports` command, the usual expression for excluding “0” entries is not working as expected.

Table 11: Resolved Issues, Platform-Specific, and Feature Change Requests (CRs) in 22.6 (continued)

CR Number	Description
xos0071532	EDP process ends unexpectedly with signal 6 when receiving EDP packets with zero length on the TLV.
xos0071554	Port group configuration is not retained after save and reboot.
xos0071607	Memory leak for process hal occurs after executing command `debug hal show forwarding distribution`.
xos0071632	The command `show nodealias ports all` does not return entries for all ports when two consecutive ports have LAG configuration.
xos0071654	Process netTools stops responding when CNAME record is present.
xos0071745	Multicast packets are dropped for some sources when the route to the source network changes.
xos0071761	User processes created using the `create process` command always run on VR-MGMT and not on VR-Default even if this is specified while creating the process.
xos0071788	The output of the `show configuration/show configuration detail` commands does not show management port related traps configuration.
xos0071822	Policy manager cannot configure flood groups when the rate-limit is already configured through CLI.
xos0071869	PIM register policy allows unpermitted group address packets when the source is in the permitted list.
xos0071912	When using "ipaddress" keyword for DHCP option 78, the DHCP ACK is sent with an incorrect value.
xos0071973	Port partition does not take effect after restoring configuration.
xos0071990	Command history buffer should be cleared when users log out.
xos0072169	CLI should restrict configuring IPv6 addresses on network and subscriber VLANs in PVLAN/VLAN aggregation.
xos0072209	RADIUS/TACACS configurations are lost after rebooting if the VLAN interface gets IP address from DHCP server.
xos0064251	TACACS CLI authorization is not working in Chalet.
xos0070982	When using Chalet to access a switch, a spike in thttpd process utilization and slow web performance occurs.
xos0071272	Python script that uses expect functionality never returns to command prompt after executing.
xos0072371	After LACP fallback is enabled with configured timeout, port is added to an aggregator with additional 2 seconds delay.
xos0072399	When using "ipaddress" keyword for DHCP options (42, 6), the DHCP ACK is sent with an incorrect value.
xos0072510	UDP profile with VLAN action does not work when VLAN names are entered in a case-insensitive manner.
ACL	

Table 11: Resolved Issues, Platform-Specific, and Feature Change Requests (CRs) in 22.6 (continued)

CR Number	Description
xos0071686	Nettools process ends unexpectedly with signal 11 when the same policy is applied as user ACL and UDP profile.
xos0071862	Need match condition to filter OSPF packet types.
AVB	
xos0068199	The AVB protocols provide limited EMS log messages for troubleshooting and debugging.
BGP	
xos0070899	Incorrect flag appears in BGP flap statistics table. Even after reaching the maximum of three flaps the output of the `show bgp neighbor flap-statistics` command shows that it is still in history.
xos0072485	The command `enable bgp neighbor` *`neighbor IP`* `remove-private-AS-number` is not removing 32-bit private AS-numbers.
BGP Auto-peering	
xos0072662	With EasyLAG being active, when EasyLAG links are disabled, and then re-enabled, the link dual-homed to a non-BGP Auto-peering device may remain in the up state incorrectly resulting in black holing of the packets.
EDP	
xos0072552	EDP process signal 11 crash occurs when sending CDP packet without port-id.
ESRP	
xos0071402	After failover, ESRP slave state does not change to ESRP master.
Extended Edge Switching	
xos0071631	With Extended Edge Switching topology and 600 IPv6 VLANs, executing the command `reboot slot` produces the following errors: `<Erro:HAL.LAG.CfgFail> Slot-1: Failed to configure link aggregation group 100:17 on slot 1 unit 0: Invalid parameter` `<Erro:HAL.LAG.CfgFail> Slot-1: Failed to configure link aggregation group 100:17 on slot 1 unit 0: Invalid parameter` `<Erro:HAL.LAG.CfgFail> Slot-1: Failed to configure link aggregation group 100:17 on slot 1 unit 0: Invalid parameter` `<Erro:HAL.LAG.CfgFail> Slot-1: Failed to configure link aggregation group 100:17 on slot 1 unit 0: Invalid parameter`
xos0071840	In a MLAG-Extended Edge Switching setup with a physical loop created between extended ports and with ELRP enabled, the CSP session goes down.
xos0072139	The controlling bridge produces the following error when creating 100 IPv6 VLANs on peer switch with maximum-gateways set to 32: `<Noti:Card.IPv6Adj.Notice> Slot-1: vrId 131074 adj fe80::4:96ff:fe99:ede8: Del: Invalid DOT1BR LAG id -1072 for TGID 0`

Table 11: Resolved Issues, Platform-Specific, and Feature Change Requests (CRs) in 22.6 (continued)

CR Number	Description
xos0072214	In MLAG scaled configuration, with broadcast traffic flowing between CB and extended ports, ISC link flaps may cause tier 2,3, and 4 BPEs CSP sessions to go down. BPEs do not recover automatically.
xos0072245	Add support to configure ping success for ESRP track-ping.
xos0072296	Rate limiting applied on extended ports belonging to different native cascade ports is incorrectly set to native cascade ports too.
xos0072161	The MAC address entries hardware table incorrectly shows 90% utilized even though the number of FDB entries present in Extended Edge-enabled switches is considerably less.
xos0072297	Auth-override is not flushing any authenticated MAC and is enabled for all sessions on a port.
Fabric Attach	
xos0072457	When a Fabric Attach (FA) server specifies a management VLAN, the ExtremeXOS FA proxy creates the VLAN if necessary, but does not add FA client ports to the management VLAN. When creating a static VLAN to be used as the FA management VLAN, you must explicitly specify a VLAN tag. If a tag is not specified, ExtremeXOS assigns one to the named VLAN, but the tag value may change.
xos0072495	When creating a static VLAN to be used as the FA management VLAN, it is important to explicitly specify a VLAN tag. If a tag is not specified, ExtremeXOS assigns one to the named VLAN, but the tag value may change.
LAG	
xos0071603	Port display string does not appear in output of commands if port is LAG master.
Mirroring	
xos0072104	If the VLAN tag is used to add a VLAN to a mirror, then the mirroring configuration output in the command `show configuration` does not appear properly.
xos0072373	In the output of the `show mirror` command, maximum supported egress instance should be updated to 1 for ExtremeSwitching X440-G2 and X620 series switches.
MPLS	
xos0071135	Service VMAN packets are being forwarded in slowpath after deleting VPLS instance.
xos0071728	A few MPLS LSPs remain in down state after several link flap events in LSP path.
xos0072170	Traffic drops when "egress cep filtering" is enabled on a VPLS service VMAN sharing port.
xos0072253	LSP takes a longer time (320 seconds) to switch over from primary path (strict) to secondary path (dynamic).
xos0072617	Memory leak occur in MPLS process when accessing ExtremePwLspOutboundMappingEntry and ExtremePwPerfEntry SNMP OID
OSPF	
xos0071613	RIP routes that are exported as OSPF external routes are advertised by the ASBR even after the routes are removed from routing table.

Table 11: Resolved Issues, Platform-Specific, and Feature Change Requests (CRs) in 22.6 (continued)

CR Number	Description
Policy	
xos0070491	etsysMultiAuthSystemCurrentNumUsers=1.3.6.1.4.1.5624.1.2.46.1.1.3 may incorrectly report a non-zero count when policy is disabled.
xos0072609	Dot1p to QoSprofile mapping may not be reflected in ONEpolicy rule when pushing ONEPolicy configuration from ExtremeManagement.
xos0072663	Under a continuous high traffic load, clients on a newly configured port/VLAN combination may not be learned in the filter database (FDB).
PTP	
xos0071026	Mirroring of Transmitted GPTP packets is not working.
Security	
xos0070675	Dot1X guest VLAN functionality is not working on NetLogin Dot1x-enabled LAG ports.
xos0070676	Dot1x client remains authenticated and is not moved to guest VLAN from destination VLAN even though EAPOL packets were not received from the Dot1x client.
xos0070761	MAC locking limit should be applied to NetLogin-enabled ports.
xos0070889	NetLogin users are authenticated to random destinations when destination VLAN attributes from the RADIUS server are not received.
xos0071872	Netlogin process ends unexpectedly with signal 11 when processing multiple web authentication requests from the same client.
xos0072175	PSTAG configurations are not removed properly after enabling policy on a switch.
xos0072208	Web-based NetLogin does not work if the supplied URL contains keywords such as "login", "hello", etc.
xos0072233	When using a static uplink VLAN, OnePolicy admin-profile macsource rule allows all MAC traffic irrespective of the configured macsource.
xos0072558	MacLockingMacViolation traps are sent periodically with NetLogin enabled.
xos0072725	When the command `clear netlogin state port 45 agent dot1x` is run, all agents on the port are cleared instead of the specified agent.
xos0072790	Cannot log on using SSH with an user account named as "root".
xos0069772	When sending traffic over an MLAG with NetLogin enabled, FDB and NetLogin sessions are properly checkpointed initially. However, after session timer expiry, the FDB entries are not properly checkpointed between peers and mismatching FDB and NetLogin session states occur.
SNMP	
xos0070265	Need MIB access to configure port speed and duplex behavior.
xos0071947	MIB extremeVlanL2statsPktsToCpu is present in the MIB definitions, but does not retrieve the l2stats values of interfaces.
xos0072267	SNMP users created by scripts and saved from another switch do not work.
xos0072538	Query of MIB object extremeSlotModuleInsertedType returns incorrect value for ExtremeSwitching X440-G2-12p/t-10GE4 switches.

Table 11: Resolved Issues, Platform-Specific, and Feature Change Requests (CRs) in 22.6 (continued)

CR Number	Description
xos0070961	Broadcast SNMP get/set-requests are processed by switches even though no IP address is configured on any VLANs.
xos0072532	SNMP process ends unexpected with signal 11 when switch tries to delete the trap receiver from the inactive queue, but the trap receiver is already deleted from the queue by SNMP.
Stacking	
xos0066163	Stacking configuration changes on standby nodes can sometimes fail.
xos0071891	EPM crash occurs if an unknown file (does not exist) is specified in the command `create process test python-module filename start auto`.
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".
STP	
xos0071418	Ports configured for BPDU restriction are re-enabled on recovery-timeout even if administratively disabled.
xos0071768	With two connected switches with one running ExtremeXOS and one running EOS, MSTI information is omitted from STP BPDUs sent by the ExtremeXOS switches.
xos0071965	ExtremeXOS switches send BPDUs with sender Bridge-ID when EOS switches are the root.
xos0071982	Need command to send own switch MAC as bridge ID in STP BPDU.
xos0072563	STP loop protect stays in "Forwarding" state instead of "Listening" state even though it did not receive any BPDU from peer device.
VRRP	
xos0072116	Telnet/SSH connections to an IP interface fail when there is continuous traffic to a VRRP virtual IP address.
xos0072698	VRRP crash occurs when host mobility is configured and new host routes are learned continuously.
VXLAN	
xos0071203	Though support for ECMP in overlay is present in 22.5, it is not officially supported until ExtremeXOS 22.6.