ExtremeXOS Release Notes

Software Version ExtremeXOS 22.5.1-Patch1-3

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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

Quality is our first concern at Extreme Networks, and we have made every effort to ensure the accuracy and completeness of this document. 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, you can do so in two ways:

- Use our short online feedback form at https://www.extremenetworks.com/documentation-feedback/.
- Email us at documentation@extremenetworks.com.

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

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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You can subscribe to email notifications for product and software release announcements, Vulnerability Notices, and Service Notifications.

1 Go to www.extremenetworks.com/support/service-notification-form.
2 Complete the form with your information (all fields are required).
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 22.5 Command Reference Guide*
- *ExtremeXOS 22.5 EMS Messages Catalog*
- *ExtremeXOS 22.5 Feature License Requirements*
- *ExtremeXOS 22.5 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 22.5.1-Patch1-3, which adds features and resolves software deficiencies.

Security Information

The following section covers important security information for ExtremeXOS 22.5.1-Patch1-3.

Critical CVEs

The following section lists addressed/fixed vulnerabilities in ExtremeXOS 22.6.

SSHD in OpenSSH Potential Denial of Service (DoS) (CVE CVE-2016-10708)

Impact	SSHD in OpenSSH before 7.4 is vulnerable to a DoS attack.
Attack Vector	remote
CVS base score	7.5 High CVSS:3.0/AV:N/AC:L/PR:N/UI:N/S:U/C:N/I:N/A:H
Description	SSHD in OpenSSH before 7.4 allows remote attackers to cause DOS attack (NULL pointer dereference and daemon crash) using an out-of-sequence NEWKEYS message, as demonstrated by Honggfuzz, related to kex.c and packet.c.
Detail	SSHD in OpenSSH before 7.4 allows remote attackers to cause DOS attack (NULL pointer dereference and daemon crash) using an out-of-sequence NEWKEYS message, as demonstrated by Honggfuzz, related to kex.c and packet.c.

OpenSSL Fatal Error May Not Be Handled Correctly (CVE-2017-3737)

Impact	OpenSSL fatal error may not be handled correctly.
Attack Vector	remote
CVS base score	5.9 Medium CVSS:3.0/AV:N/AC:H/PR:N/UI:N/S:U/C:H/I:N/A:N

Description	The OpenSSL error state works for explicit handshake functions (SSL_do_handshake(), SSL_accept() and SSL_connect()), however due to a bug it does not work correctly if SSL_read() or SSL_write() is called directly. In that scenario, the handshake can fail, but data is passed without being decrypted/encrypted directly from the SSL/TLS record layer.
Detail	OpenSSL 1.0.2 (starting from version 1.0.2b) introduced an "error state" mechanism. The intent was that if a fatal error occurred during a handshake, then OpenSSL would move into the error state and would immediately fail if you attempted to continue the handshake. This works as designed for the explicit handshake functions (SSL_do_handshake(), SSL_accept() and SSL_connect()), however due to a bug it does not work correctly if SSL_read() or SSL_write() is called directly. In that scenario, if the handshake fails then a fatal error will be returned in the initial function call. If SSL_read()/SSL_write() is subsequently called by the application for the same SSL object then it will succeed and the data is passed without being decrypted/encrypted directly from the SSL/TLS record layer. In order to exploit this issue an application bug would have to be present that resulted in a call to SSL_read()/SSL_write() being issued after having already received a fatal error. OpenSSL version 1.0.2b-1.0.2m are affected. Fixed in OpenSSL 1.0.2n. OpenSSL 1.1.0 is not affected.

OpenSSL Version

ExtremeXOS 22.5.1-Patch1-3 uses FIPS fips-ecp-2.0.16.

Linux Kernel

ExtremeXOS 22.5.1-Patch1-3 uses Linux Kernel 3.18.48, plus selected fixes released in later 3.18 patches.

Upgrading ExtremeXOS

While ExtremeXOS 22.5.1-Patch1-3 supports all features on all applicable platforms as indicated in these release notes, upgrading to ExtremeXOS 22.5.1-Patch1-3 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 67 and Known Behaviors on page 68. For information about recommended releases for specific platforms, see https://www.extremenetworks.com/support/compatibility-matrices/sw-release-extremexos-eos.

For instructions about upgrading ExtremeXOS software, see "Software Upgrade and Boot Options" in the *ExtremeXOS 22.5 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.

New and Corrected Features in ExtremeXOS 22.5.1-Patch1-3

This section lists the new and corrected features supported in the 22.5.1-Patch1-3 software:

BOOTP Relay over L3VPN

Starting with ExtremeXOS 22.5, you can enable BOOTP Relay over VRFs and VPN-VRFs in the same manner as with normal VRs.

Supported Platforms

Summit X460-G2, X670-G2, X770, and ExtremeSwitching X870, X690 series switches.

Limitations

- VPN-ID is not supported on DHCP-Relay Option 82, which services clients across VPNs.
- IPv6 BOOTP Relay is not supported, since there is no IPv6 support for L3VPN.

Cisco Discovery Protocol (CDP) Voice VLAN Tag in Every Packet

Cisco Discovery Protocol (CDP) voice VLAN tag is now in all CDP packets by default. You can configure this behavior with the **advertise** option in the `configure cdp voip-vlan ports` command (see below):

Supported Platforms

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

Changed CLI Commands

Changes are underlined.

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

The output of the following show command is changed to be similar to the Extreme Discovery Protocol (EDP) show command output:

`show cdp ports` {*port_list*} {**configuration** | **detail**}

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).

Algorithmic Longest-Prefix Match (ALPM) Improvements to Increase Long-Mask IPv6 Routes

Starting with ExtremeXOS 22.5, the **ipv6-mask-length** option provides greater hardware route scale and IP route sharing (ECMP) support for IPv6 "long-mask routes", meaning IPv6 subnets with mask lengths 65–128 bits. This provides additional scale and resilience for IPv6 host routes whose mask length is 128 bits (see Limits on page 27). The default IPv6 mask length is 64.

Supported Platforms

Summit X670-G2, X770, and ExtremeSwitching X870, X690 series switches.

Limitations

Increasing scale and providing ECMP for IPv6 mask 65–128 routes decreases IPv4 route scale.

Changed CLI Commands

Changes are underlined.

```
configure forwarding internal-tables [ l2-and-l3 | more [l2 | l3-and-
ipmc | routes] {ipv6-mask-length [64 | 128]}]
```

Zero Touch Provisioning (ZTP) DHCP Discovery over Tagged VLANs

Prior to ExtremeXOS 22.5, Zero Touch Provisioning (ZTP) and ZTP+ have been limited to using DHCP services on untagged VLANs. Many customers only use tagged VLANs on uplinks when connecting switches at the edge of the network. To discover either Extreme Management Center or ExtremeCloud, DNS queries need to be carried over the tagged VLAN. This feature introduces an active DHCP discovery mechanism for user data ports.

Supported Platforms

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

Logging Unabbreviated Commands

You can specify that logged commands appear in fully expanded form, rather than in the abbreviated form you may have used when entering them in the command line.

For example, with command expansion enabled, a command entered in abbreviated format, such as

```
config por 33 auto of spee 10000 duplex ful
```

appears in the log as:

```
configure ports 33 auto off speed 10000 duplex full
```

Supported Platforms

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

New CLI Commands

`enable cli-config-logging` **`expansion`**

`disable cli-config-logging` **`expansion`**

Stacking License Upgrade Process Improvement

All master-capable switches in a stack must run the same license level. Previously, if you applied a license upgrade to a master-capable node, it went immediately into the failed state due to a license mismatch.

If you apply a license upgrade to a node that creates a license mismatch, this feature generates warning log and console messages every five minutes alerting you of the license mismatch, rather that putting the node into the failed state. This gives you time to resolve the license mismatch without affecting service. Keep in mind that if a failover were to occur while there is a license mismatch, some features may be disabled due to licensing restrictions which could cause service disruption. After all master-capable node licenses match the primary node's licenses, the log and console messages stop, and a stack failover functions as expected.

Supported Platforms

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

Changed CLI Commands

Changes are underlined.

`show licenses [`*`slot`*` | `**`all`**`]`

Policy icmptype and icmp6type Classification Rules

ExtremeXOS 22.5 introduces icmptype and icmp6type classification rule support for ONEPolicy.

Supported Platforms

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

Changed CLI Commands

Changes are underlined.

```
configure policy rule profile_index [ether ether | icmp6type icmp6type |
icmptype icmptype | ip6dest ip6dest |ipdestsocket ipdestsocket | ipfrag
| ipproto ipproto | ipsourcesocket ipsourcesocket | iptos iptos | ipttl
ipttl | macdest macdest | macsource macsource | port port |
tcpdestportIP tcpdestportIP | tcpsourceportIP tcpsourceportIP |
udpdestportIP udpdestportIP | udpsourceportIP udpsourceportIP ] {mask
mask } {port-string [ port_string | all]} {storage-type [non-volatile |
volatile]} {drop | forward} {cos cos }

unconfigure policy rule [ profile_index] [all-pid-entries ] | [[ether |
icmp6type | icmptype |ip6dest | ipdestsocket | ipfrag |ipproto |
ipsourcesocket | iptos | ipttl | macdest | macsource | port |
tcpsourceportIP | udpsourceportIP | tcpdestportIP | udpdestportIP ]
[all-traffic-entries | data] {mask mask} {port-string port_string|all}}]
```

The output of the following show commands displays icmptype and icmp6type rule information:

```
show policy profile {all | profile_index} {detail}

show policy rule {all | {profile-index profile_index | admin-profile}
ether {ether} | icmp6type {icmp6type} | icmptype {icmptype} | ip6dest
{ip6dest} | ipdest {ipdest} | ipfrag | ipproto {ipproto} | ipsource
{ ipsource } | iptos { iptos } | ipttl { ipttl } | macdest { macdest } |
macsource { macsource } | port { port } | tcpdestportIP
{ tcpdestportIP } | tcpsourceportIP { tcpsourceportIP } | udpdestportIP
{ udpdestportIP } | udpsourceportIP { udpsourceportIP }} {mask mask }
{port-string [ port_string | all]} {storage-type [non-volatile |
volatile]} {drop | forward} {cos cos | admin-pid admin_pid }} {detail |
wide}
```

Virtual Extensible LAN (VXLAN) Tunnel Improvements

For ExtremeXOS 22.5, a number of enhancements have been added for VXLAN that support routing in and out of tunnels (RIOT).

Tenants may have multiple overlays across a data center network where different VLANs belonging to the same tenant are mapped to different VXLAN Network Identifiers (VNIs). Tenants require routing between the VLANs, and VXLAN gateway nodes would need to act as Layer 3 gateways that are capable of routing traffic between tenant VLANs. Inter-overlay routing involves routing:

- Routing traffic from a tenant VLAN into a tunnel with the destination overlay's VNI.
- Routing traffic from a tunnel to a tenant VLAN that is different from the tenant VLAN associated with the VNI in the received packet's VXLAN header.
- Routing traffic from a tunnel to the same or different tunnel.

A VXLAN tunnel endpoint (VTEP) is designated as the gateway for an overlay by manually configuring it or by running a first hop redundancy protocol (FHRP), such as Virtual Router Redundancy Protocol (VRRP) on the tenant VLAN on the gateways and letting the protocol determine the placement of the router.

The following enhancements are included in ExtremeXOS 22.5 to support RIOT:

- Enable IP forwarding on tenant VLANs.
- ExtremeXOS switches route traffic from an access VLAN to another access VLAN where either or both access VLANs are configured to be VXLAN tenant VLANs.
- Initiate ARP requests across VXLAN tunnels.
- Learn ARPs from encapsulated ARP responses received on VXLAN tunnels.
- Static ARP configuration with neighbor reachable over tunnel.
- ExtremeXOS switches route tenant traffic from access VLANs into VXLAN tunnels, and VXLAN tunnels to access VLANs.
- VRF support for overlay VLANs.
- Underlay and overlay have separate time to live (TTL) spaces (inner TTL is decremented by 1 at the Layer 3 gateway at tunnel initiation).
- Underlay and overlay networks have a common Differentiated Services Code Point (DSCP)/Type of Service (ToS) space.
- Layer 3 gateway functionality in conjunction with Virtual Router Redundancy Protocol (VRRP). Layer 3 gateway is VRRP master (ExtremeSwitching X690 series switches only).
- Static overlay route configuration with tunnel next hops.

Supported Platforms

The VXLAN enhancements (unless otherwise noted) are supported on the Summit X770, X670-G2, and ExtremeSwitching X870, X690 series switches, and stacks with X770, X670-G2, X870, and X690 slots only.

RIOT is supported on ExtremeSwitching X690 series switches.

Fabric Attach Server Mode Supported and Policy Improvement

For ExtremeXOS 22.5, the Fabric Attach feature now supports:

- Fabric Attach server mode for VXLAN overlay networks.

  Fabric Attach operates in server mode whenever one or more fabrics are created. The Fabric Attach server may receive mapping requests from any of several sources (CLI, client/proxy requests using LLDP, or network authentication services such as RADIUS and policy).
- Policy can configure NSI mappings based on the RADIUS-returned “policy name”.

  This allows the mappings to be derived from the RADIUS configuration and avoid configuration conflicts between users.

Supported Platforms

For Fabric Attach server mode: Summit X770, X670-G2, and ExtremeSwitching X870, X690 series switches.

For Fabric Attach proxy mode: Summit X450-G2, X460-G2, X670-G2, X770, and ExtremeSwitching X440-G2, X870, X620, X690 series switches.

New CLI Commands

`configure fabric attach` **`management-vlan`** [*`vlan_id`* | *`vlan_name`* | **`untagged`** | **`none`**]

Changed CLI Commands

The following show commands are changed to display Fabric Attach mode:

```
show [{vlan} vlan_name | vlan {vlan_id}] fabric attach assignments

show fabric attach elements
```

sFlow Extensions

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.

This feature expands 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 new show command).

Supported Platforms

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

New CLI Commands

```
show sflow hardware-utilization
```

Extended Edge Switching

ExtremeXOS 22.5 introduces support for Extended Edge Switching.

Figure 1 shows the Extended Edge Switching switching architecture, based on the *IEEE 802.1BR* specification, comprising one or two controlling bridges (CBs), and one or more bridge port extenders (BPEs). In the Extreme implementation, BPEs are V400 Virtual Port Extenders, and CBs are ExtremeXOS switches.

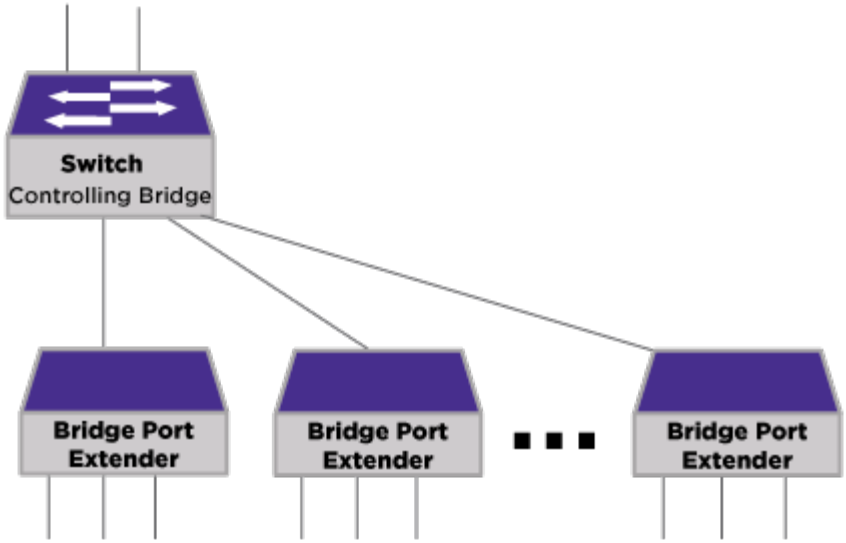

Figure 1: Extended Edge Switching Architecture

Since BPEs are managed like slots in a chassis under a single management domain, multiple layers of a traditional network can be reduced from a configuration and management perspective, greatly simplifying the network operation.

As opposed to expanding the network using additional switches, BPEs provide the following benefits:

- No console. BPEs are configured and managed through the controlling bridge (CB) user interface, so there is no need to connect a terminal console connection to each BPE.
- No out-of-band management.
- Single point of license management.
- Single point for configuring/debugging/diagnostics.
- Single node when managed by Extreme Management Center or other management software products.

Supported Platforms

The following switches are supported as controlling bridges: Summit X670-G2 and ExtremeSwitching X690 series switches

The following V400 Virtual Port Extender models are available:

Table 3: V400 Virtual Port Extender Models

Model Numbers	Description
V400-24t-10GE2	V400 Series 24 10/100/1000BASE-T, 2 1000/10GBaseX unpopulated SFP+ ports, fixed power supply and fan.
V400-24p-10GE2	V400 Series 24 10/100/1000BASE-T PoE+, 2 1000/10GBaseX unpopulated SFP+ ports, fixed power supply and fans, and optional redundant power supply.
V400-48t-10GE4	V400 Series 48 10/100/1000BASE-T, 4 1000/10GBaseX unpopulated SFP+ ports, fixed power supply and fan.
V400-48p-10GE4	V400 Series 48 10/100/1000BASE-T PoE+, 4 1000/10GBaseX unpopulated SFP+ ports, fixed power supply, fans, and optional redundant power supply. Power supply is for PoE devices only.

For information about which optics are supported with the V400 Virtual Port Extenders, see the *Extreme Hardware/Software Compatibility and Recommendation Matrices*.

Limitations

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 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 series switches) in use. For applicable limits, see the Limits on page 27 tables for the controlling bridge you are using.

- Certain ExtremeXOS features are not supported or have limitations. For information, see the *ExtremeXOS 22.5 User Guide*.
- A maximum of 48 attached BPEs is supported.
- A maximum of 4 levels (tiers) of upstream BPEs is supported.
- A maximum of 4 upstream ports (in a LAG) per BPE is supported.
- Stacking cannot be enabled with VPEX enabled.

New CLI Commands

```
enable vpex

disable vpex

configure vpex ports port_list slot slot_num

configure slot slot description [ slot_description | none ]

unconfigure vpex ports port_list slot

show vpex

show vpex bpe

show vpex bpe {slot slot_num} {environment}

show vpex bpe {slot slot_num} {statistics} {detail}
```

```
show vpex ports ports_list

show vpex ports {port_list} ecp statistics

show vpex ports {port_list} {statistics} {detail}

show vpex bpe { slot slot_num} cpu-utilization

show vpex bpe { slot slot_num} version detail

start orchestration mlag peer_name

stop {orchestration}
```

Changed CLI Commands

Changes are underlined.

```
reboot {[time mon day year hour min sec] | cancel} {slot slot-number }
{all}
```

The following show command is changed to display information about the new Port Extension TLV:

```
show lldp {port [all | port_list]} neighbors {detailed}
```

The following show command is changed to display the name of a BPE:

```
show slot {slot {detail} | detail }
```

BGP Auto-peering

Auto-peering is a network of cooperating interconnected devices that create an AutoBGP for any topology, providing fully redundant, multipath routing. The fabric grows dynamically and freely, not bound to any well-known topology such as Clos or Leaf/Spine.

Auto-peering nodes build a secure network by running the very scalable Border Gateway Protocol (BGP) to exchange topology and host information about IP networks. It uses IPv6 as the network layer to transport IPv4 and IPv6 traffic.

Any device connecting to an auto-peering device is an attachment point to the network. This network provides the underlay for services such as VXLAN, policy, VRF, and Fabric Attach. The AutoBGP device applies policy rules as it discovers external devices. These devices can be any IP host, LAG-attached servers and bridges, or gateway routers. By default, auto-peering allows connectivity for all attached hosts, allowing for a controller-less operation. However, interconnection (trunk ports) between fabric nodes should not be LAG ports; you should not enable port sharing on trunk ports.

BGP auto-peering includes the following features:

- EBGP:
  - Facilitates IP host routing on Default VR
  - Single command (no IP address assignments required for interlinks)
  - IPv6 link locals for interlink addresses
  - LLDP for discovery (proprietary, but RFC is in draft to be standardized)

    - BGP peering on link-local addresses
    - Automatic EVPN peering
- Route redistribution on Default VR:
    - Static routes
    - OSPFv2/v3
- Routing in-and-out of tunnels (RIOT) with redundant attachments (see Virtual Extensible LAN (VXLAN) Tunnel Improvements on page 13)
    - MLAG (active/active)
    - EasyLAG (active/standby)—default when no MLAG is configured
- Multicast (PIM-DM)

Supported Platforms

Summit X670-G2, X770, and the ExtremeSwitching X690, X870 series switches.

This feature requires the Advanced Edge license. For more information about licenses, see the *ExtremeXOS 22.5 Feature License Requirements*.

Limitations

The following features are not supported in BGP auto-peering:

- Stacking
- AutoBGP LAG with Extended Edge Switching
- Static LAG attachments to AutoBGP
- AutoBGP links on Extended Edge Switching ports
- MPLS, VPLS, L2VPN, L3VPN
- PIM Snooping, PIM-SM, SSM mode
- OSPF, OSPFv3, ISIS, RIP, RIPNG per VRF
- IPv6 within VRF
- VRF route leaking
- EVPN multi-homing Ethernet segments
- Explicit-remotes mode used for VNET flooding
- VXLAN symmetric routing
- AutoBGP MLAG
- EVPN does not interoperate with third-party devices

The following limitations apply:

- Manual configuration of MLAG is supported. One MLAG peer per leaf node.
- Loss of first multicast packet in the flow is expected due to slow path forwarding.
- Static router must be an external router per VRF.
- VLANS spanning multiple bridges, where each bridge is AutoBGP LAG connected, must be VXLAN-based, or AutoBGP LAG replaced with MLAG.
- VLANs behind a bridge that is AutoBGP LAG connected *and* AutoBGP node has same VLAN ports must be VXLAN-based or AutoBGP LAG replaced with MLAG.

New CLI Commands

`create auto-peering` **`bgp vlans`** *`vlan_list`* **`routerid`** *`ipaddress`* **`AS-number`** *`asNumber`*

`delete auto-peering`

`show auto-peering`

Changed CLI Commands

Changes are underlined.

`show iproute ipv6 origin [`**`auto-peering direct`** | **`static`** | **`blackhole`** | **`ripng`** | **`ospfv3`** | **`ospfv3-intra`** | **`ospv3-inter`** | **`ospfv3-extern1`** | **`ospfv3-extern2`** | **`isis`** | **`isis-level-1`** | **`isis-level-2`** | **`isis-level-1-external`** | **`isis-level-2-external`** | **`bgp`** | **`ibgp`** | **`ebgp`** | **`bootp`** | **`host-mobility`**] {**`vr`** *`vr_name`*}

The following show command was changed to show auto-peering information:

`show iproute {`**`ipv4`**`} {`**`priority`** | **`vlan`** *`vlan_name`* | **`permanent`** | *`ip_address netmask`* | **`summary`**} {**`multicast`** | **`unicast`**} {**`vr`** *`vrname`*}}

Policy to Virtual Extensible LAN (VXLAN) Mapping

ExtremeXOS 22.5 allows you to create Virtual Extensible LAN (VXLAN)-to-policy mappings by applying the VXLAN identifier (VNI) to a profile (where NSI = VNI). Network Service Identifier (NSI) provides a mechanism to apply the VXLAN/NSI mappings in policy using a profile-based attribute. NSI is a 24-bit value ranging from 1 to 16,777,215, where none (default) indicating no NSI for the VXLAN.

The maptable response can be configured to apply policy in the following ways:

- Policy: VLAN/NSI mappings from policy profile are used if present. Mappings in RADIUS response are ignored.
- Tunnel: VLAN/NSI mappings from RADIUS are used if present. Mappings in policy profile are ignored.
- Both: VLAN/NSI mappings from either RADIUS or policy profile may be used. However, mappings in RADIUS response have a higher precedence over policy profile when both contain mappings.

Supported Platforms

Summit X770, X670-G2, and ExtremeSwitching X870, X690 series switches, and stacks with X770, X670-G2, X870, and X690 slots only.

Changed CLI Commands

Changes are underlined.

`configure policy profile` *`profile_index`* {**`name`** *`name`*} {**`pvid`** *`pvid`*} {**`pvid-status`** *`pvid_status`*} {**`cos`** *`cos`*} {**`cos-status`** *`cos_status`*} {**`egress-vlans`** *`egress_vlan_list`*}{**`forbidden-vlans`** *`forbidden_vlans`*} {**`untagged-vlans`** *`untagged_vlans`*} {**`append`** | **`clear`**} {**`tci-overwrite`** *`tci_overwrite`*} {**`auth-`**

override *auth_override*} {**nsi** [*nsi* | **none**]} {**web-redirect** *web_redir_index*}

Comparing Configurations

You can now view the differences between switch configuration files or a configuration file with the running configuration.

Supported Platforms

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

New CLI Commands

show configuration **difference** { *from-config-file* {*to-config-file*} } {*module-name*} {**detail**} {**context** *lines*}

OpenSSH Upgrade and Increased support for Diffie-Hellman Groups

OpenSSH server and client is upgraded from 6.5p1 to 7.5p1.

Support for key exchange algorithms diffie-hellman-group14-sha256 (2,048 bits), diffie-hellman-group16-sha512 (4,096 bits), and diffie-hellman-group18-sha512 (8,192 bits) is added.

Earlier versions of ExtremeXOS had all supported algorithms configured by default; for ExtremeXOS 22.5, several weaker algorithms are disabled by default, which can be re-enabled if desired.

The following SSH parameters are enabled by default:

In Default mode:

- Ciphers: aes128-ctr, aes192-ctr, aes256-ctr, chacha20-poly1305@openssh.com
- MACs: hmac-sha1-etm@openssh.com, hmac-sha2-256-etm@openssh.com, hmac-sha2-512-etm@openssh.com, hmac-sha1, hmac-sha2-256, hmac-sha2-512

In Default, FIPS, and Secure mode:

- Key exchange algorithms: Diffie-Hellman groups 14 (2,048 bits), 16 (4,096 bits), 18 (8192 bits)
- User key algorithms: ssh-rsa, x509v3-sign-rsa, x509v3-sign-dss

The following algorithms are *disabled* by default in ExtremeXOS 22.5:

In Default mode;

- Ciphers: 3des-cbc, blowfish-cbc, aes128-cbc, aes192-cbc, aes256-cbc, cast128-cbc, rijndael-cbc@lysator.liu.se, arcfour, arcfour128, arcfour256
- MACs: hmac-md5, hmac-md5-96, hmac-md5-etm@openssh.com, hmac-md5-96-etm@openssh.com, hmac-ripemd160, hmac-ripemd160@openssh.com, hmac-ripemd160-etm@openssh.com, hmac-sha1-96, hmac-sha1-96-etm@openssh.com
- Key exchange algorithms: diffie-hellman-group1-sha1 (1,024 bits)

In Default, FIPS, and Secure mode:

- Key exchange algorithms: diffie-hellman-group1-sha1 (1,024 bits)
- User key algorithms: ssh-dss

Upgrading to ExtremeXOS 22.5 and Later

When upgrading from earlier releases to ExtremeXOS 22.5, supported ciphers, MACs, public key algorithms are inherited from the earlier releases.

Note

DSA (ssh-dss) related host key algorithms are not supported in both server and client in ExtremeXOS 22.5 and later. However, for backward compatibility, it is supported in the server after an upgrade to ExtremeXOS and later if DSA host key is present in the earlier release.

Supported Platforms

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

Changed CLI Commands

Changes are underlined.

`configure ssh2 dh-group minimum [1 | 14 |16 |18]`

The following show command is changed to show the new Diffie-Hellman groups:

`show ssh2`

Avoiding Potential Loss of TLS Syslog Logging

For Linux, by default, it takes about 15 minutes for kernel to end a TCP connection when transmitted data remains unacknowledged. This results in a potential loss of logs to TLS Syslog server during the 15 minutes window due to link down. ExtremeXOS 22.5 provides a command to reduce this window.

Supported Platforms

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

New CLI Commands

`configure syslog tls tcp-user-timeout [seconds | default]`

Changed CLI Commands

The following show command is changed to display the Syslog TLS TCP user timeout value:

`show log configuration`

Ability to Restrict TACACS Authentication with Privilege Level Attribute

You can set the requirement that the privilege level attribute (priv-lvl) must be specified for TACACS authentication to occur. Setting the privilege level attribute as required does not change any behavior associated with values received in the priv-lvl attribute, only the presence/absence of the attribute.

Supported Platforms

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

New CLI Commands

`configure tacacs` **`priv-lvl`** `[`**`required`** | **`optional`**`]`

Power Supply Fan Air Flow Direction Information

ExtremeXOS 22.5 now shows external power supply (PSU) fan airflow direction. This allows you to determine PSU fan direction easily and not have to search for this information in datasheets.

Supported Platforms

- ExtremeSwitching X440-G2—all models
- Summit X450-G2—non-PoE models
- ExtremeSwitching X620-8t-2x and X620-10x

Changed CLI Commands

The following show command using the **`detail`** option is changed to show fan air flow direction:

`show power {`*`ps_num`*`} {`**`detail`**`}`

Creating Processes on Secondary Nodes

Prior to ExtremeXOS 22.5 in stacking, you could only create and run processes on the primary node. To support failover capability, processes can now be created on the primary, secondary, or both nodes.

Supported Platforms

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

Changed CLI Commands

Changes are underlined.

`create process` *`name`* `executable` *`exe`* `{start [`**`auto`** | **`on-demand`**`]} {`**`node`** *`node`*`} {`*`vr vr-name`*`} {`**`description`** *`description`*`} {`*`arg1 {arg2 { arg3 { arg4 { arg5 { arg6 { arg7 { arg8 { arg9 }}}}}}}}}`

`create process` *`name`* **`python-module`** *`python-module`* `{`**`start`** `[`**`auto`** | **`on-demand`**`]} {`**`node`** *`node`*`} {`**`vr`** *`vr-name`*`} {`**`description`** *`description`*`} {`*`arg1 {arg2 {arg3 {arg4 {arg5 {arg6 {arg7 {arg8 {arg9}}}}}}}}}`

RESTFul API for Telemetry/L2/PoE

For ExtremeXOS 22.5 the RESTful API YANG model are updated for telemetry, Layer2, and Power over Ethernet (PoE).

For more information, see http://api.extremenetworks.com/EXOS/ProgramInterfaces/RESTCONF/RESTCONF.html.

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 22.5 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 22.5.1-Patch1-3 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/.

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

For detailed information on which MIBs and SNMP traps are supported, see the *Extreme Networks Proprietary MIBs* and *MIB Support Details* sections in the *ExtremeXOS 22.5 User Guide*.

Tested Third-Party Products

This section lists the third-party products tested for ExtremeXOS 22.5.1-Patch1-3.

Tested RADIUS Servers

The following RADIUS servers are fully tested:

- Microsoft—Internet Authentication Server
- Meetinghouse
- FreeRADIUS

Tested Third-Party Clients

The following third-party clients are fully tested:

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

PoE Capable VoIP Phones

The following PoE capable VoIP phones are fully tested:

- Avaya 4620
- Avaya 4620SW IP telephone
- Avaya 9620
- Avaya 4602
- Avaya 9630

- Avaya 4621SW
- Avaya 4610
- Avaya 1616
- Avaya one-X
- Cisco 7970
- Cisco 7910
- Cisco 7960
- ShoreTel ShorePhone IP 212k
- ShoreTel ShorePhone IP 560
- ShoreTel ShorePhone IP 560g
- ShoreTel ShorePhone IP 8000
- ShoreTel ShorePhone IP BB 24
- Siemens OptiPoint 410 standard–2
- Siemens OpenStage 20
- Siemens OpenStage 40
- Siemens OpenStage 60
- Siemens OpenStage 80

Extreme Switch Security Assessment

DoS Attack Assessment

Tools used to assess DoS attack vulnerability:

- Network Mapper (NMAP)

ICMP Attack Assessment

Tools used to assess ICMP attack vulnerability:

- SSPing
- Twinge
- Nuke
- WinFreeze

Port Scan Assessment

Tools used to assess port scan assessment:

- Nessus

Service Notifications

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

2 Limits

This chapter summarizes the supported limits in ExtremeXOS 22.5.1-Patch1-3.

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

- Edge (Supported Limits for Edge License on page 27)
- Advanced Edge (Supported Limits for Advanced Edge License on page 52)
- Core (Supported Limits for Core License on page 60)

For more information about licenses, see *ExtremeXOS 22.5 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
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

Table 4: Supported Limits for Edge License (continued)

Metric	Product	Limit
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
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

Table 4: Supported Limits for Edge License (continued)

Metric	Product	Limit
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 22.5 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	8
	For standalone: Summit X770, X670-G2, X460-G2, X450-G2, ExtremeSwitching X870, X690, X590	32
	For stacked: Summit X770, X670-G2, X460-G2, X450-G2, X670-G2, and ExtremeSwitching X870, X690, X590	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 the you to use a total of four slots, while there are no more then two egress instances. The maximum possible combination for mirroring instances: 1 4 ingress 2 3 ingress + 1 egress 3 2 ingress + 2 egress 4 2 (ingress + egress) 5 1 (ingress + egress) + 2 ingress 6 1 (ingress + egress) + 1 egress + 1 ingress	16 (including default mirroring instance)
	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
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

Table 4: Supported Limits for Edge License (continued)

Metric	Product	Limit
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
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

Table 4: Supported Limits for Edge License (continued)

Metric	Product	Limit
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
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

Table 4: Supported Limits for Edge License (continued)

Metric	Product	Limit
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
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

Table 4: Supported Limits for Edge License (continued)

Metric	Product	Limit
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.
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

Table 4: Supported Limits for Edge License (continued)

Metric	Product	Limit
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
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]

Table 4: Supported Limits for Edge License (continued)

Metric	Product	Limit
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
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

Table 4: Supported Limits for Edge License (continued)

Metric	Product	Limit
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
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

Table 4: Supported Limits for Edge License (continued)

Metric	Product	Limit
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 ExtremeSwitching X440-G2	4,096 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 ExtremeSwitching X440-G2	1,024 600
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 ExtremeSwitching X440-G2, X620	63 16 (local-only VRs)
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

Table 4: Supported Limits for Edge License (continued)

Metric	Product	Limit
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	2,048
	ExtremeSwitching X440-G2, X620	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	32
	ExtremeSwitching X440-G2	28
	Summit X460-G2, X770	26
	ExtremeSwitching X620	16
	Summit X450-G2	29
	Summit X460-G2	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
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 has 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

Table 4: Supported Limits for Edge License (continued)

Metric	Product	Limit
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 ExtremeSwitching X440-G2, X620	2,046 255
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 Summit X450-G2, and ExtremeSwitching X440-G2, X620	2,048 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
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

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

Metric	Product	Limit
BGP auto-peering attached IPv6 hosts— maximum number of attached IPv6 hosts.	Summit X670-G2, X770	254
	ExtremeSwitching X870, X690, X590	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
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

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

Metric	Product	Limit
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
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

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

Metric	Product	Limit
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
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

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

Metric	Product	Limit
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
OVSDB Managed Switches—Maximum number of OVSDB-managed switches.	Summit X770, X670-G2, ExtremeSwitching X870, X690, X590	1
	Smmit X450-G2	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)

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

Metric	Product	Limit
PIM IPv4 Limits—maximum number of multicast sources per group.	Summit X460-G2, X670-G2, X770, X450-G2, ExtremeSwitching X870, X690, X590	5,000
	ExtremeSwitching X440-G2, X620	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	1,750
	Summit X450-G2	1,500
	ExtremeSwitching X440-G2, X620	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
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

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

Metric	Product	Limit
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 ExtremeSwitching X440-G2, X620	 511 128
	Scaled Mode (with groups): Summit X770, X670-G2, X460-G2, X450-G2, and ExtremeSwitching X870, X690, X590 ExtremeSwitching X440-G2, X620	 2,048 128
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 ExtremeSwitching X440-G2, X620	 511 128
	Scaled Mode (with groups): Summit X770, X670-G2, X460-G2, X450-G2, and ExtremeSwitching X870, X690, X590 ExtremeSwitching X440-G2, X620	 2,048 128
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
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

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

Metric	Product	Limit
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
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

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

Metric	Product	Limit
VXLAN—maximum virtual networks with dynamic learning and OSPF extensions for VXLAN	Summit X670-G2, X770, and ExtremeSwitching X870, X690, X590	4,000
	Summit X460-G2, X450-G2, and ExtremeSwitching X440-G2, X620	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	256
	Summit X450-G2	204
BGP (networks)—maximum number of BGP networks.	Summit X460-G2, X670-G2, X770, ExtremeSwitching X870, X690, X590	1,024
	Summit X450-G2	820
BGP (peers)—maximum number of BGP peers. Note: With default keepalive and hold timers.	Summit X460-G2, X670-G2, X770, ExtremeSwitching X870	128
	ExtremeSwitching X690, X590	300
	Summit X450-G2	100
BGP (peer groups)—maximum number of BGP peer groups.	Summit X460-G2, X670-G2, X770, ExtremeSwitching X870, X690, X590	64
	Summit X450-G2	50
BGP (policy entries)—maximum number of BGP policy entries per route policy.	Summit X460-G2, X670-G2, X770, ExtremeSwitching X870, X690, X590	256
	Summit X450-G2	204
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

Table 6: Supported Limits for Core License (continued)

Metric	Product	Limit
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
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

Table 6: Supported Limits for Core License (continued)

Metric	Product	Limit
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
IS-IS IPv6 L1 routes in an L1/L2 router—recommended maximum number of IS-IS Level 1 routes in a L1/I2 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

Table 6: Supported Limits for Core License (continued)

Metric	Product	Limit
IS-IS IPv4/IPv6 L2 routes in an L2 router—recommended maximum number of IS-IS Level 2 routes in a Level 2 IS-IS router. The numbers documented are based on 50% IPv4 routes and 50% IPv6 routes.	Summit X460-G2, X670-G2, X770, and ExtremeSwitching X870, X690, X590 Summit X450-G2	20,000 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 Summit X450-G2	20,000 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 Summit X460-G2 ExtremeSwitching X870 Summit X450-G2	14,000 10,000 11,000 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 Summit X770, X670-G2, X460-G2 Summit X450-G2	10,000 5,000 4,000
OSPFv2 inter- or intra-area routes—recommended maximum number of inter- or intra-area routes contained in an OSPF LSDB with one ABR in OSPF domain.	ExtremeSwitching X870, X690, X590 Summit X670-G2, X460-G2, X770 Summit X450-G2	4,000 2,000 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 Summit X450-G2	400 320

Table 6: Supported Limits for Core License (continued)

Metric	Product	Limit
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
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

Table 6: Supported Limits for Core License (continued)

Metric	Product	Limit
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)
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 22.5.1-Patch1-3.

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

CR Number	Description
ExtremeSwitching X620 Series Switches	

xos0070048	When reverting from failover back to master in stack, on FHR router with static entry added on LHR, the following errors appear:
	`11/08/2017 03:45:00.68 <Erro:HAL.IPv6Mc.Error> Slot-1: Unable to Add IPmc vlan 20 for 1:3 s,G=2001:0011:0000:0000:0000:0000:0000:0002,ff07:0000:0000:0000:0000:0000:0000:0001 IPMC 1, unit 0 Entry not found`
	`11/08/2017 03:45:04.74 <Erro:HAL.IPv6Mc.Error> Slot-1: Unable to Del IPmc vlan 20 for 1:3 s,G=2001:0011:0000:0000:0000:0000:0000:0002,ff07:0000:0000:0000:0000:0000:0000:0001 IPMC 1, unit 0 Entry not found`

ExtremeSwitching X690 Series Switches	
xos0071218	On ExtremeSwitching X690-48x switches, the flow control appears as "None" for the first 8 ports.
xos0071226	RIOT support for the ExtremeSwitching X690 series switches reduces the ECMP group limit by half for maximum gateway settings. See Table 4 on page 28.
BGP Auto-peering	
xos0070932	With BGP auto-peering and VXLAN setup, traffic is not forwarded to some RTEPs, when back-to-back ECMP links are connected.
Extended Edge Switching	
xos0068764	Enabling EAPS master on primary extended port with multiple VLANs (~300 protected VLANs for EAPS Domain), high EAPS convergence time occurs.

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

CR Number	Description
xos0071958	Loading a script with a configuration that enables sharing on a cascade port causes the command to fail if the BPE slot is detected before sharing is applied on the cascade port. Workaround: Disable all the ports, load the configuration script, and then re-enable the ports.
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. Workaround: To recover, reboot the controlling bridge, or disable, and then enable, the CB's native cascade 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.

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
Policy	
xos0065208	FDB learning using admin profile without NetLogin still has "n" (= NetLogin) flag set in the output of the `show fdb` command.
Extended Edge Switching	

xos0070981	In Extended Edge Switching setup, policy hardware install rule errors appear when users are authenticated on extended LAG ports with tci-overwrite enabled:
	
	`# FAILURE: Placing in simulated TcamHW: Rule Id 0 addr=0x70aa17e0 Begin:`
	`Unit=0 Pri=1048577 BcmPri=9437311 Type=10=Policy Profile Compress=0 numCreated=0 numInstalled=0`

xos0069606	When traffic with VLAN ID 0 and a priority are received on untagged ports (by extended port), VLAN priority is reset to 0 on egress tagged ports on L2 VLANs..

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

CR Number	Description
xos0069648	Egress ACLs only match known (not unknown) unicast traffic. **Workaround:** Apply ACL on ANY.
xos0069697	Egress mirroring of L3 traffic is not working; however, egress mirroring of L2 traffic is working.
xos0069859	OSPF hello packets are not forwarded by ExtremeSwitching X670-G2 series switches (as controlling bridge) on L2 VLANs. Consequently, OSPF neighborship is not established. **Workaround:** Create an L3 interface on the switch by assigning IP address to the VLAN.
xos0069877	Temporary errors appear after enabling, and then disabling, jumbo frames on CB: `<Erro:HAL.Port.Error> Slot-1: pibL3MTUExceededInstallFilter(): Could not add action to send to CPU on 1:1, unit 0 (Table full). <Erro:HAL.Port.Error> Slot-1: pibL3MTUExceededInstallFilter(): Could not add action to send to CPU on 1:3, unit 0 (Table full) <Erro:HAL.Port.Error> Slot-1: pibL3MTUExceededInstallFilter(): Could not add action to send to CPU on 1:4, unit 0 (Table full).`
VRRP	
xos0071167	When a large number of ARP routes are sent to a switch with VRRP host-mobility enabled, it can take a while for all of the routes to appear in the route table due to a limitation of host-mobility of learning routes at 100 per second.
VXLAN	
xos0070974	Due to a hardware limitation, congestion occurs with packet drop when VXLAN unknown L2 unicast traffic is received and sent to 10G port even though only approximately half the bandwidth is being used.

Resolved Issues in ExtremeXOS 22.5

The following issues were resolved in ExtremeXOS 22.5. 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, and ExtremeXOS 22.4. For information about those fixes, see the release notes for the specific release.

Resolved Issues, Platform-Specific, and Feature Change Requests (CRs) in 22.5

CR Number	Description
ExtremeSwitching X440-G2 Series Switches	
xos0071152	ExtremeSwitching X440-G2 stacks when sending CPU-to-CPU traffic experience HG ports to going down randomly..
xos0069919	On ExtremeSwitching X440-G2 SummitStacks, CPU-generated/-forwarded multicast/broadcast packets are not transmitted on ports 25–48 of non-master node.
Summit X450-G2 Series Switches	
xos0058653	Flow control capability is advertised even after disabling both Rx and Tx pause
xos0070437	Reboot occurs when DHCPv6 is enabled on Management VLAN when existing DHCPv6 sessions exist on VR-Default.
Summit X460-G2 Series Switches	
xos0051464	The command `debug hal configure stacking` **`port`** *`port#`* [**`enable`**|**`disable`**] is not working in stacks.
xos0069055	SNMP times out while reading extremeEntityFRUTable for SFP temperature sensor and the following error appears: entity_fru_getinfo: Invalid entity 612.
xos0070406	Legacy Nortel phones do not power up with Summit X460-G2 series switches using legacy detection mode.
Summit X670-G2 Series Switches	
xos0068055	No log messages are provided regarding power delivery or denial.
Summit X770 Series Switches	
xos0068355	When scaling to 131,000 VLAN/port combinations, rebooting Summit X770 series switches produces the following error message: `Crit:vlan.err.criticalInfo> Critical Info: Forcing vlan mgr to READY - Timer expired - 1 appls did not send load cfg acks`
ExtremeSwitching X690 Series Switches	
xos0068848	IPv6 L3 Unicast packets destined to front-panel port 30 are slowpath forwarded instead of hardware forwarded if port 30 is not a member of a load share group.
xos0068870	When using the OE Solutions RBT12SEX-IT3 (MGBIC-BX40-U) and RBT12SEX-IT4 (MGBIC-BX40-D) transceivers, the command `show port configuration` displays a media type of "NONE".
xos0068871	When using the OE Solutions RBT12SVX-IT4 (MGBIC-BX120-U) and RBT12SVX-IT5 (MGBIC-BX120-D) transceivers, media type appears as "NONE" when issuing the `show port configuration` command.
xos0070521	Mirroring does not work on ExtremeSwitching X690 series switches when mirroring configuration is set up prior to insertion of cable or optics in monitor port.
xos0070593	On ExtremeSwitching X690 series switches, rarely, AAA process gets restarted after configuring clear text shared secret password for RADIUS.

CR Number	Description

xos0070731	On ExtremeSwitching X690 series switches, FIPS error messages appear when configuring the clear text shared secret for RADIUS:
	
	`Error: FIPS_mode_set(1) failed. Reason: error:24064064:random number generator:SSLEAY_RAND_BYTES:PRNG not seeded`
	`Given key is not a valid encrypted key. Please provide a valid encrypted key that is encrypted by the switch. Legacy Set Failed for index 2147483644`

ExtremeSwitching X870 Series Switches	
xos0070825	When ARPs use the extended hash table, the packets that are forwarded using these ARP entries contain incorrect MAC addresses.
xos0071371	BCMAsync process ends unexpectedly with signal 6 when modifying extended view ARP entry to LAG port.
General	
xos0067374	Display exact primary/secondary image versions (including patch info) in `show switch` similar to one that is displayed by `show version image`.
xos0070635	Switch configurations made through Extreme Management Center or SNMP do not persist through a reboot.
xos0052545	During failover from EBGP to VPNv4 IBGP route, VPNv4 IBGP route is removed causing loss in connectivity over L3VPN.
xos0070016	IP route compression is enabled automatically after configuring an IP address in a VLAN created over user VR.
xos0070213	The command disable/enable ipforwarding broadcast" does not get reflected unless the egress ports are disabled, and then enabled again.
xos0070350	With ping protection configured for the static routes, IP routes are not becoming active.
xos0070498	Kernel crashes randomly after learning FDB entries with the port instance of VLAN as null.
xos0070592	OSPF neighborship is not re-established after configuring IP multicast forwarding option "to-cpu" to off, and then back on, over the LAG port in VLAN.
xos0071021	HAL process ends unexpectedly due to memory corruption with eFence is enabled.
xos0070566	Unnecessary LLDP debug messages appear on switch console when Fabric Attach neighbor is added.
xos0071340	In the output of `show mvrp ports counters event` command, MVRP LeaveAll Tx packets appear as Rx packets.
xos0069105	"restconf" and "ping" crash when DNS is enabled.
xos0069372	Chalet, CLI, and SNMP permit different allowed characters for sysName, sysLocation, sysContact."
xos0061649	Clearing licenses requires a reboot, which if not performed before applying new licenses can cause a switch to crash.
xos0065398	On ExtremeSwitching X690 and X870 series switches stack ports, only 100G passive copper cables are supported.
xos0068766	Diffserv replacement priority and codepoint configurations are not preserved after a save and reboot.

CR Number	Description
xos0069198	Creating VLANs with reserved keywords using SNMP or Policy Manager is incorrectly allowed.
xos0069688	Chalet muliple authentication approach needs to be combine into a single authentication approach.
xos0069700	SFP+ links are not coming up when connecting with an INTEL Fortville x710 Intel PCI card.
xos0070046	On ExtremeSwitching X690 and X870 series switches, incorrect values appear for cached and buffer memory in `top` command output.
xos0070786	If jumbo frames are initially enabled on a port, which then becomes a master port of a load-sharing group, followed by enabling jumbo frames on all ports, then in the output of the command `show configuration vlan`, jumbo-frames are disabled on the slave ports of the load-sharing group.
xos0070819	Information about PSU fan airflow direction needs to be added to the `show power` command.
xos0069554	On ExtremeSwitching X620 series switches, copper combo port link flaps when SFP+ is inserted in the corresponding fiber combo port. On ExtremeSwitching X440-G2 and Summit X460-G2 series switches, copper combo port link flaps when SFP is removed from the corresponding fiber combo port.
xos0068900	On the Summit X460-G2, X450-G2, and X480 series switches, FDB entries are not removed in software and hardware after FDB aging time expires.
ACL	
xos0070419	In the ExtremeXOS User Guide ACL chapter, applicable direction for `source/destination` **`port`** *`range`* needs to be updated.
xos0070672	HAL process ends unexpectedly when executing `show access-list counter` after refreshing a user-created policy.
xos0070775	HAL process ends unexpectedly when executing the `configure access-list` **`delete`** *`acl_name`* **`all`** command after refreshing the ACL.
xos0071294	On ExtremeSwitching X440-G2 and X620 series switches, rules with more than two "l4-match" statements do not install in single-wide mode (or more than "l4-match" statements in double-wide mode).
AVB	
xos0068199	The AVB protocols provide limited EMS log messages for troubleshooting and debugging.
BGP	
xos0066333	BGP session remains in IDLE state when BFD is enabled for peer.
xos0067516	When two ingress policies with same number for as-path length is added to BGP peer, route table is not learning as multipath route, whereas BGP learns as multipath.
Clocking	
xos0070525	Grandmaster clock change takes an excessive amount of time to propagate in a cascade network.
DHCP/BOOTP	

CR Number	Description
xos0063125	DHCP option 82 check for circuit ID is not working properly with client-connected VLANS that have multiple ports with one port configured with circuit ID string and the other without a circuit ID string configured.
xos0064448	After unconfiguring a switch and loading a script with two DHCPv6 clients, only one client gets an IPv6 address and the other remains in initializing state.
xos0065271	DHCP Relay with option 82 check fails if the client is connected by a LAG port, is on a different slot, and has port information string configured.
xos0068326	L3 routing is not working after rebooting an interface that received IP address from DHCP server.
LAG/MLAG	
xos0069566	On an ExtremeSwitching X870/X690 mixed stack, ports 91–96 on any X870 node should not be used. There are many possible incorrect behaviors possible if ports 91–96 are used on any X870 node in such a stack. Among the known behaviors are L2 Unicast flows received on X690 nodes being unable to reach destinations attached to ports 91–96 on X870 nodes and packet duplication of non-Unicast flows on multiple link aggregation member ports when ports 91–96 on an X870 node are configured as members of a link aggregation group.
xos0070088	With alternate IP address configuration, MLAG ports are disabled when the other MLAG peer comes up after a reboot.
xos0071030	“Ingress Block Port” list is not updated in the kernel for MLAG sharing port after reboot.
xos0071468	In WMLAG, static MAC address of second peer is not flushed from FDB table during failure scenarios.
MPLS	
xos0068153	BGP ORF capability enabled while creating BGP peer group.
xos0070035	FDB entry is learned on incorrect service VMAN after a reboot.
xos0070036	FDB entry is learned on incorrect service VMAN after dynamically adding a member port to the LAG.
xos0070427	The command `show mpls ldp label retained lsp` output should also display the LSR-ID.
MVRP	
xos0065119	When an MLAG peer is rebooted, the dynamically added uplink ports on the remote nodes are removed from the VLAN causing traffic loss.
NetLogin	
xos0067290	With a low level of continuous traffic, the display of blackholed FDB entries shown by the command `show netlogin port x` is cleared and not re-set
xos0069806	Number of simultaneous TCP session should be restricted during web-based NetLogin authentication.
xos0069810	NetLogin Dot1x authentication fails if supplicant response is received after EAPOL requests expire.
xos0070165	Timeout error appears in browser when trying to authenticate more than one client in web based NetLogin.

CR Number	Description
xos0070829	NetLogin mac-list without password added by Extreme Management controller is lost after rebooting the switch.
xos0071373	New TACACS command `configure tacacs priv-lvl [optional | required]` has been implemented.
OSPF	
xos0069475	Changing the OSPFv3 retransmit interval to greater than 2,000, and then restarting OSPFv3 process, removes OSPFv3 interface configuration.
Policy	
xos0069875	Warning message that appears when enabling NetLogin MAC in policy mode needs to be removed.
xos0071077	The "tag" match condition is not working with BGP routing policies.
xos0071279	ELRP packets are not flooded to other port of the VLAN that has admin profile configured.
xos0071387	In the ExtremeXOS User Guide Routing Policies chapter, a note regarding "tag" match condition needs to be updated.
Python	
xos0069948	When cloning over a network with the reference switch/stack having earlier than ExtremeXOS 22.4 on one partition and later than 22.4 on the other partition, one of the partitions is corrupted.
Security	
xos0066530	ARP validation violations are not blocking the port when the client is in subVLAN.
xos0069579	If client port information is missing for some DHCP snooping entries, "FDB lookup failed" errors appear while uploading DHCP bindings.
xos0070601	When the MAC-locking threshold is set to 0, then the learn-limit-action (disable port) is not triggered for the second violation.
xos0071076	The command `configure tacacs timeout` does not take effect.
SNMP	
xos0062492	Traps having tabular variables as varbinds should include the instance along with the tabular OID.
xos0062527	The varbinds of extremePowerSupplyGood, extremePsuPowerStatus traps need to include the instance along with the OID.
xos0066791	The object return value for "extremeStackDetection" is true for stacking, and should be false for a standalone switch, but it does not return any value.
xos0066792	Snmpset is not allowed on read-write object "extremeStackDetection".
xos0067145	extremeSaveConfiguration call causes other SNMP sets to fail.
xos0067627	Q-Bridge MIB object dot1qNumVlans(1.3.6.1.2.1.17.7.1.1.4) incorrectly includes Management VLAN.
xos0067630	Snmpget on dot1qVlanCurrentTable object with 4095 index returns the Management VLAN details when it should only include user VLAN details.
xos0070534	The OID extremeImageToUseOnReboot cannot be used to select the image to be booted on reboot.

CR Number	Description
SSH	
xos0069422	Exiting an SSH client session causes the SSH server to unexpectedly initiate a session close request.
Stacking	
xos0070018	In the command `show checkpoint-data` output, need to show IPML connection status between master and backup in a stack.
xos0070185	Rebooting SummitStack backup node causes BFD process to end unexpectedly while syncing up BFD sessions.
xos0070454	Unable to rename dynamic VLAN created by MVRP.
xos0070754	ExtremeSwitching X440-G2-48 stack reboots while sending IP option packets.
xos0063748	The using the **none** option in the command `configure sys-recovery-level` is ignored when you reboot a node stuck in the failed state.
STP	
xos0069839	If edge safeguard is enabled on a port before configuring the link type as edge, then the operational edge status of that port becomes false resulting in the port behaving like a normal STP port.
xos0070993	The STP port link-type configuration is not retained when a untagged port is deleted from a VLAN that is part of an STP domain and then added in another VLAN that is also part of the STP domain. This results in the port behaving like a normal STP port, even though the configuration appears in the output of the `show configuration stpd` command.
xos0071049	STP process ends unexpectedly when deleting STP configuration on a port.
VLAN	
xos0069896	Link flaps on multiple ports cause VLAN process utilization to increase excessively.
xos0070503	A source MAC address is re-added on PSTAG ports if the same MAC address is arriving on the master and a member of sharing.
VRRP	
xos0071120	After renaming a VRRP VLAN, `show vrrp/show configuration` commands produce the following error and configuration is lost for other VLANs after a reboot: `Error: VRRP VR for vlan deep, vrid 1 does not exist. Please create the VRRP VR before assigning parameters.`

Resolved Issues in ExtremeXOS 22.5.1-Patch1-2

The following issues were resolved in ExtremeXOS 22.5.1-Patch1-2. ExtremeXOS 22.5.1-Patch1-2 includes all fixes up to and including ExtremeXOS 11.6.5.3, and earlier, ExtremeXOS 12.0.5, ExtremeXOS 12.1.7, ExtremeXOS 12.2.2-patch1-12, ExtremeXOS 12.3.6, ExtremeXOS 12.4.5, ExtremeXOS 12.5.5, ExtremeXOS 12.6.3, ExtremeXOS 12.6.5, ExtremeXOS 12.7.1, ExtremeXOS 15.1.5, ExtremeXOS 15.2.4, ExtremeXOS 15.3.3, ExtremeXOS 15.4.1, ExtremeXOS 15.5.1, ExtremeXOS 15.5.2, ExtremeXOS 15.6.1, ExtremeXOS 15.6.2, ExtremeXOS 15.7.1, ExtremeXOS 16.1, ExtremeXOS 16.1.2, ExtremeXOS 16.1.3, 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 9: Resolved Issues, Platform-Specific, and Feature Change Requests (CRs) in 22.5.1-Patch1-2

CR Number	Description
General	
xos0060606	Dot1x authentication fails when Dot1x state machine remains in connecting state for the client.
xos0070318	Fallback to older option 43 Zero Touch Provisioning (ZTP) does not happen if ZTP+ fails.
xos0070961	Broadcast SNMP get/set-requests are processed by switches even though no IP address is configured on any VLANs.
xos0071485	RADIUS supplied policy does not supersede default configured policy on user authentication.
xos0072003	Admin profile ACL rules are not always installed when the associated profile has tci-overwite enabled.
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`
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.
xos0072233	When using a static uplink VLAN, OnePolicy admin-profile macsource rule allows all MAC traffic irrespective of the configured macsource.
xos0072250	With NetLogin in policy mode, FDB entries are created on previously authenticated user's untagged VLAN instead of base VLAN.
xos0072297	Auth-override is not flushing any authenticated MAC and is enabled for all sessions on a port.
xos0072316	PTP IP multicast packets are not forwarded.
xos0072382	After NetLogin client authentication, at random times ARP entries are programmed without port numbers.
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.
xos0072599	Directed broadcast traffic is not forwarded unless a port in the egress VLAN is restarted.
xos0072801	If a NetLogin MAC address entry is learned on multiple VLANs, then the entry is re-authenticated only in the first VLAN on which it was authenticated.

Table 9: Resolved Issues, Platform-Specific, and Feature Change Requests (CRs) in 22.5.1-Patch1-2 (continued)

CR Number	Description
xos0072913	After timing out on Dot1x supplicant expiry timer, switch does not respond to EAPOL start packets received from supplicants.
xos0072940	Port does not come up when connected with 2-pair (1,2,3,6 wire connected) Ethernet cable.
xos0072978	Dot1x authentication fails when Dot1x state machine remains in aborting state for the client.
xos0073143	After retrieving VLAN statistics through SNMP or CLI in a certain sequence, switch stops responding to VLAN related SNMP polling and show commands.
xos0073224	In Policy mode, dynamically added ports on a VLAN for a MAC session are not removed from the VLAN even though the MAC session is overwritten by a Dot1x session.
xos0073251	Snmpmaster process ends unexpectedly in rare cases when packets received at an application fail.
xos0072180	Intermittent loops in an Extended Edge Switching with MLAG configuration cause tier 3 CSP sessions to go down.
xos0072278	FDB is learned based on untagged-VLAN attribute, and not on the base VLAN when PVID is set to 4,095.
xos0072302	ExtremeXOS image upgrade fails on bridge port extenders (BPEs) when ingress sFlow is enabled on native cascade ports.
xos0072477	FDB is learned on incorrect VLAN when both macsource and admin rule are configured on the ONEPolicy-enabled port.
xos0072567	Idle timer is triggered when continuous tagged ingress traffic occurs on NetLogin MAC authenticated ports.
xos0072670	BFD control packets generated in hardware BFD mode do not have correct Dot1p/ DSCP values.
xos0072979	After rebooting the switch or restarting the Dot1x supplicant, Dot1x state machine remains in connecting state, and clients are not authenticated if MAC and Dot1x are enabled on the same port.
ExtremeSwitching X690 Series Switches	
xos0071325	Multicast packets with TTL value 1 traffic is flooded on ExtremeSwitching X690 series switches.

Resolved Issues in ExtremeXOS 22.5.1-Patch1-3

The following issues were resolved in ExtremeXOS 22.5.1-Patch1-3. ExtremeXOS 22.5.1-Patch1-3 includes all fixes up to and including ExtremeXOS 11.6.5.3, and earlier, ExtremeXOS 12.0.5, ExtremeXOS 12.1.7, ExtremeXOS 12.2.2-patch1-12, ExtremeXOS 12.3.6, ExtremeXOS 12.4.5, ExtremeXOS 12.5.5, ExtremeXOS 12.6.3, ExtremeXOS 12.6.5, ExtremeXOS 12.7.1, ExtremeXOS 15.1.5, ExtremeXOS 15.2.4, ExtremeXOS 15.3.3, ExtremeXOS 15.4.1, ExtremeXOS 15.5.1, ExtremeXOS 15.5.2, ExtremeXOS 15.6.1, ExtremeXOS 15.6.2, ExtremeXOS 15.7.1, ExtremeXOS 16.1, ExtremeXOS 16.1.2, ExtremeXOS 16.1.3, ExtremeXOS 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 10: Resolved Issues, Platform-Specific, and Feature Change Requests (CRs) in 22.5.1-Patch1-3

CR Number	Description
General	
xos0064449	VLAN process ends unexpectedly with signal 11 when disable sharing port/delete VLAN ports with ESRP configuration.
xos0072246	Captive portal redirection is not working after restart port is issued on LAG ports.
xos0073312	Note should be displayed when configuring Dot1x server timeout, such that the value should be greater than RADIUS server timeout.
xos0073383	Memory leak occurs on HAL when port is removed, and then added back to a LAG.
xos0073394	FDB is not check-pointed correctly with W-MLAG configuration.
xos0073478	ELRP disables an excluded port when ELRP loop protection is enabled at egress.
xos0073516	NetLogin-authenticated clients are cleared with the reason admin-reset when other clients that were earlier authenticated on that port existing under a terminated session moved to non-NetLogin port.
xos0073578	The traffic destined to the web-redirect server is blocked when default drop is applied to a profile with "pvid 0".
xos0073608	Dropped packets on eth0 interface are accounted for in ifInErrors instead of IfInDiscards.
ExtremeSwitching X690 Series Switches	
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.