



# ExtremeXOS Release Notes

Software Version ExtremeXOS 31.5

9037162-00 Rev AC  
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# Preface

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Read the following topics to learn about:

- The meanings of text formats used in this document.
- Where you can find additional information and help.
- How to reach us with questions and comments.

## Conventions

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To help you better understand the information presented in this guide, the following topics describe the formatting conventions used for notes, text, and other elements.

### Text Conventions

Unless otherwise noted, information in this document applies to all supported environments for the products in question. Exceptions, like command keywords associated with a specific software version, are identified in the text.

When a feature, function, or operation pertains to a specific hardware product, the product name is used. When features, functions, and operations are the same across an entire product family, such as ExtremeSwitching switches or SLX routers, the product is referred to as *the switch* or *the router*.

**Table 1: Notes and warnings**

| Icon  | Notice type | Alerts you to...  |
|---|-------------|---|
|  | Tip         | Helpful tips and notices for using the product          |
|  | Note        | Useful information or instructions                      |
|  | Important   | Important features or instructions                      |
|  | Caution     | Risk of personal injury, system damage, or loss of data |
|  | Warning     | Risk of severe personal injury                          |

**Table 2: Text**

| Convention                             | Description   |
|--|---|
| screen displays                        | This typeface indicates command syntax, or represents information as it is displayed on the screen.   |
| The words <i>enter</i> and <i>type</i> | When you see the word <i>enter</i> 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 <i>type</i> .           |
| <b>Key</b> names                       | Key names are written in boldface, for example <b>Ctrl</b> or <b>Esc</b> . If you must press two or more keys simultaneously, the key names are linked with a plus sign (+). Example: Press <b>Ctrl+Alt+Del</b> |
| <i>Words in italicized type</i>        | Italics emphasize a point or denote new terms at the place where they are defined in the text. Italics are also used when referring to publication titles.  |
| <b>NEW!</b>                            | New information. In a PDF, this is searchable text.   |

**Table 3: Command syntax**

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

## Platform-Dependent Conventions

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

- ExtremeSwitching® 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/](http://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 device 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 *device*.

## Send Feedback

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The Information Development team at Extreme Networks has made every effort to ensure that this document is accurate, complete, and easy to use. We strive to improve our documentation to help you in your work, so we want to hear from you. We welcome all feedback, but we especially want to know about:

- Content errors, or confusing or conflicting information.
- Improvements that would help you find relevant information.
- Broken links or usability issues.

To send feedback, do either of the following:

- Access the feedback form at <https://www.extremenetworks.com/documentation-feedback/>.
- Email us at [documentation@extremenetworks.com](mailto:documentation@extremenetworks.com).

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

## Help and Support

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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: (800) 998 2408 (toll-free in U.S. and Canada) or 1 (408) 579 2826. For the support phone number in your country, visit: [www.extremenetworks.com/support/contact](http://www.extremenetworks.com/support/contact)

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

- Your Extreme Networks service contract number, or serial numbers for all involved Extreme Networks products
- A description of the failure
- A description of any actions 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

## Subscribe to Product Announcements

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

1. Go to [The Hub](#).
2. In the list of categories, expand the **Product Announcements** list.
3. Select a product for which you would like to receive notifications.
4. Select **Subscribe**.
5. To select additional products, return to the **Product Announcements** list and repeat steps 3 and 4.

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

## Related Publications

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### ExtremeXOS Publications

- [ACL Solutions Guide](#)
- [ExtremeXOS 31.5 Command Reference Guide](#)
- [ExtremeXOS 31.5 EMS Messages Catalog](#)
- [ExtremeXOS 31.5 Feature License Requirements](#)
- [ExtremeXOS 31.5 SNMP Traps Reference](#)
- [ExtremeXOS 31.5 User Guide](#)
- [ExtremeXOS Quick Guide](#)
- [ExtremeXOS Release Notes](#)
- [Extreme Hardware/Software Compatibility and Recommendation Matrices](#)
- [Extreme Optics Compatibility](#)
- [Switch Configuration with Chalet for ExtremeXOS 21.x and Later](#)
- [Using AVB with Extreme Switches](#)

### Extreme Management Center Publications

- [Extreme Management Center User Guide](#)

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# Overview

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These release notes document ExtremeXOS 31.5, which adds features and resolves software deficiencies.

## Security Information

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The following section covers important security information for ExtremeXOS 31.5.

### Linux Kernel

ExtremeXOS 31.5 uses Linux Kernel 4.14.

### OpenSSL Version

ExtremeXOS 31.5 uses FIPS openssl-fips-2.0.16.

## Upgrading ExtremeXOS

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For instructions about upgrading ExtremeXOS software, see *Software Upgrade and Boot Options* in *ExtremeXOS 31.5 User Guide*.

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.

## Stacking: Upgrading from ExtremeXOS 30.2 and Earlier

You cannot automatically update a switch running ExtremeXOS 30.2 or earlier to ExtremeXOS 30.3 or later due to a file system compatibility issue. If a switch has ExtremeXOS 30.2 or earlier, prior to inserting the switch into the stack topology, you need to upgrade the switch manually:

1. To download and install a new image, the active partitions (primary or secondary) of all non-master nodes must match the active partition of the master node.
  - a. To determine the active partition selected on all nodes and the ExtremeXOS versions installed in each partition, use the `show slot {slot} {detail} | detail` command with the **detail** option. If the node being upgraded is running on the primary partition, then the new image is downloaded and installed on the secondary partition.
  - b. If the active partition is different on some nodes, the action you take depends on what is stored in both partitions:

If both primary and secondary partitions have the same ExtremeXOS release, you can use the following commands to cause a node to use the same active image as the rest of the stack:

```
use image {primary | secondary} slot slot-number
reboot slot slot-number
```

2. Download a new ExtremeXOS software release and install it on all nodes on the active topology using the command: `download [url url {vr vrname} | image [active | inactive] [[hostname | ipaddress] filename {{vr} vrname} {block-size block_size}] {partition} {install {reboot}}`
3. Restart all nodes in the new release using `reboot {[time mon day year hour min sec] | cancel} {slot slot-number} {all}`

## Newly Purchased Switches Require Software Upgrade

Newly delivered switches typically have pre-GA (general availability) ExtremeXOS software installed. You should promptly upgrade the ExtremeXOS software to the latest version available by visiting the [Extreme Portal](#).

For information about upgrading the ExtremeXOS software, see the *ExtremeXOS Upgrade Process* topic in the *Software Upgrade and Boot Options* chapter of the [ExtremeXOS 31.5 User Guide](#).

## Default ExtremeXOS® Settings

The following table shows the default settings for ExtremeXOS starting with version 30.3, and shows any changes that have been made to these settings and in what version these changes were made.

**Table 4: Default ExtremeXOS Settings**

| Feature  | 30.3   | 30.5 | 30.6 | 31.1 | 31.2      | 31.3 | 31.4   | 31.5 |
|--|--|------|------|------|-----------|------|--|------|
| 1G behavior in 10G ports (5420 and 5520 series switches) | Autoneg ON for port when 1G optic is inserted in a 10G port          |      |      |      |           |      | Autoneg OFF for port when 1G optic is inserted in a 10G port |      |
| Account Lockout  | After 3 consecutive login failures, account is locked for 5 minutes. |      |      |      |           |      |  |      |
| AVB  | Disabled.  |      |      |      |           |      |  |      |
| BFD Strict Session Protection                            | Disabled.  |      |      |      |           |      |  |      |
| BGP  | Disabled.  |      |      |      |           |      |  |      |
| Bluetooth  | Enabled.   |      |      |      |           |      |  |      |
| BOOTP Relay  | Disabled.  |      |      |      |           |      |  |      |
| CDP  | Enabled.   |      |      |      |           |      |  |      |
| Configuration auto save                                  | Disabled.  |      |      |      |           |      |  |      |
| Clear-flow   | Disabled.  |      |      |      |           |      |  |      |
| Diagnostics  | Admin level privileges required to show diagnostics.                 |      |      |      |           |      |  |      |
| DHCP   | Disabled.  |      |      |      |           |      |  |      |
| DNS Cache Resolver and Analytics                         | Disabled.  |      |      |      |           |      |  |      |
| IPFIX  | Disabled.  |      |      |      |           |      |  |      |
| IP NAT   |  |      |      |      | Disabled. |      |  |      |
| EAPS   | Disabled.  |      |      |      |           |      |  |      |

**Table 4: Default ExtremeXOS Settings (continued)**

| Feature                        | 30.3  | 30.5 | 30.6 | 31.1      | 31.2 | 31.3 | 31.4 | 31.5 |
|--------------------------------|---|------|------|-----------|------|------|------|------|
| EDP                            | Enabled on management port.   |      |      |           |      |      |      |      |
| ELRP                           | Disabled.   |      |      |           |      |      |      |      |
| ESRP                           | Disabled.   |      |      |           |      |      |      |      |
| Extended Edge Switching (VPEX) | Disabled.   |      |      |           |      |      |      |      |
| ExtremeCloud IQ                | N/A.  | N/A. |      | Enabled   |      |      |      |      |
| Identity Management            | Disabled.   |      |      |           |      |      |      |      |
| IGMP                           | Enabled, set to IGMPv2 compatibility mode.                                |      |      |           |      |      |      |      |
| IGMP Snooping                  | Enabled.  |      |      |           |      |      |      |      |
| Image Integrity Check          |   |      |      | Disabled. |      |      |      |      |
| IP Route Compression           | Enabled.  |      |      |           |      |      |      |      |
| ISIS                           | Disabled.   |      |      |           |      |      |      |      |
| Log                            | Admin level privileges required to show log.                              |      |      |           |      |      |      |      |
| Logging memory buffer          | Generate an event when the logging memory buffer exceeds 90% of capacity. |      |      |           |      |      |      |      |
| MAC Security                   | Disabled.   |      |      |           |      |      |      |      |

<sup>a</sup> If you choose enhanced security mode when initially setting up the switch or after running `unconfigure switch all`.

**Table 4: Default ExtremeXOS Settings (continued)**

| Feature                          | 30.3                                      | 30.5  | 30.6   | 31.1 | 31.2 | 31.3 | 31.4 | 31.5 |
|----------------------------------|---|---|--|------|------|------|------|------|
| MLD                              | Disabled.                                 |   |  |      |      |      |      |      |
| MLD Snooping                     | Disabled.                                 |   |  |      |      |      |      |      |
| MPLS                             | Disabled.                                 |   |  |      |      |      |      |      |
| MSRP                             | Disabled.                                 |   |  |      |      |      |      |      |
| MSTP                             | Enabled.                                  |   |  |      |      |      |      |      |
| NetLogin                         | All types of authentication are disabled. |   |  |      |      |      |      |      |
| NTP                              | Disabled.                                 |   |  |      |      |      |      |      |
| ONEPolicy                        | Disabled.                                 |   |  |      |      |      |      |      |
| Policy rule model                |   | Access list (Unless upgrading to 30.5 with existing policy rules configuration, then the default is hierarchical. | Hierarchical (Unless upgrading from 30.5 with a saved configuration set to access list.) |      |      |      |      |      |
| OpenFlow                         | Disabled.                                 | Not supported.  |  |      |      |      |      |      |
| OSPF                             | Disabled.                                 |   |  |      |      |      |      |      |
| OVSDB                            | Disabled.                                 |   |  |      |      |      |      |      |
| Passwords                        | Plain text password entry not allowed.    |   |  |      |      |      |      |      |
| PIM                              | Disabled.                                 |   |  |      |      |      |      |      |
| PIM Snooping                     | Disabled.                                 |   |  |      |      |      |      |      |
| PoE<br>Fast PoE<br>Perpetual PoE | Enabled.<br>Disabled.<br>Disabled.        |   |  |      |      |      |      |      |

**Table 4: Default ExtremeXOS Settings (continued)**

| Feature                       | 30.3   | 30.5 | 30.6               | 31.1 | 31.2   | 31.3               | 31.4 | 31.5 |
|-------------------------------|--|------|--------------------|------|--|--------------------|------|------|
| RADIUS                        | Disabled for both switch management and network login.   |      |                    |      |  |                    |      |      |
| RIP                           | Disabled.  |      |                    |      |  |                    |      |      |
| RMON                          | Disabled. However, even in the disabled state, the switch responds to RMON queries and sets for alarms and events. |      |                    |      |  |                    |      |      |
| sFlow                         | Disabled.  |      |                    |      |  |                    |      |      |
| SNMP server                   | Disabled.  |      |                    |      |  |                    |      |      |
| SSH                           | Disabled.  |      |                    |      |  |                    |      |      |
| Stacking                      | —  | —    |                    |      |  |                    |      |      |
| Stacking auto-discovery       | Enabled.   |      |                    |      |  |                    |      |      |
| STP                           | Enabled.   |      |                    |      |  |                    |      |      |
| Syslog                        | Disabled.  |      |                    |      |  |                    |      |      |
| TACACS                        | Disabled.  |      |                    |      |  |                    |      |      |
| Telnet                        | Disabled.  |      |                    |      |  |                    |      |      |
| VPEX IP Multicast Replication | Controlling Bridge   | BPE  | Controlling Bridge | BPE  | 31.2.1: BPE<br>31.2.1-Patch1-5: Controlling Bridge | Controlling Bridge |      |      |
| VPLS                          | All newly created VPLS instances are enabled.  |      |                    |      |  |                    |      |      |

**Table 4: Default ExtremeXOS Settings (continued)**

| Feature         | 30.3      | 30.5 | 30.6 | 31.1 | 31.2 | 31.3 | 31.4 | 31.5 |
|-----------------|-----------|------|------|------|------|------|------|------|
| Watchdog        | Enabled.  |      |      |      |      |      |      |      |
| Web HTTP server | Disabled. |      |      |      |      |      |      |      |

## ExtremeXOS Image File Names

You can identify the appropriate image or module for your platform based on the file name prefix of the image.

**Table 5: ExtremeXOS Image Types (Prefixes)**

| Switches   | Image File Type (Prefix)   |
|--|--|
| ExtremeSwitching X465, X690, X695, X590, and X870          | onie-<br>Example: onie-22.2.1.2.xos<br><br><b>Note:</b> These image files use the Open Network Install Environment (ONIE). |
| ExtremeSwitching X440-G2, X450-G2, X460-G2, X670-G2, X620, | summitX-<br>Example: summitX-22.2.1.2.xos  |
| ExtremeSwitching X435                                      | summitlite_arm-<br>Example:<br>summitlite_arm-30.5.0.102.xos   |
| ExtremeSwitching 5520, 5420                                | summit_arm<br>Example: summit_arm-31.1.0.3.xos   |

## New and Corrected Features in ExtremeXOS 31.5

This section lists the new and corrected features supported in the 31.5 software:

### VXLAN + VMAN Customer Edge Ports Support

The following VMAN with Customer Edge Ports (CEP) can be configured as VXLAN Tenant VMANs:

- CEP with or without VLAN Translation
- CEP with port-cvid
- VMAN ports with Egress cvid Filtering
- VMAN ports with a secondary Ethertype



#### Note

This support does not apply to VPEX Extended Ports.



#### Note

Egress filtering cannot be configured on network ports. If configured, there will be a drop in (VXLAN/MPLS) tunneled packets.

## ExtremeSwitching 5420 MACsec Support

MACsec support is available on ExtremeSwitching 5420 series switches beginning with ExtremeXOS 31.5. MACsec is available on all ports of all models except stacking ports. The maximum number of MACsec-enabled ports per system is 48. In the case of a stacked system, each slot supports up to 48 MACsec-enabled ports.



### Note

The MACsec feature requires the installation of the MAC Security feature pack license.

### *Protocol Exclusions*

On ExtremeSwitching 5420 series switches, the MACsec protocol is mutually exclusive with other protocols. If MACsec is enabled, then the following list of protocols cannot be enabled. If any of the other protocols are enabled, then MACsec cannot be enabled:

- Audio Video Bridge (AVB) - The MACsec/AVB restriction is system-wide, not per port. AVB configuration is not allowed when MACsec is enabled on any port.
- Virtual Port Extender (VPEX) - VPEX configuration is not allowed when MACsec is enabled on any port.

### *Supported Platform*

The details of this feature are specific to the ExtremeSwitching 5420 series.

### *Limitations*

Note the following limitations with ExtremeSwitching 5420 MACsec support:

- MKA and MACsec is not supported on the management port, or stacking ports when **stacking-support** is enabled.
- ExtremeXOS restricts enabling MACsec on a given port if MACsec on the port will exceed the maximum port count of 48 per system.
- If the bandwidth of MACsec-enabled ports exceeds the switch's maximum MACsec capacity (25Gbps, 40Gbps or 50Gbps, bidirectional), then packets will be dropped according to their QoS priority.
- Hardware Assisted IPsec is not supported.
- MACSec-enabled sharing ports cannot be used as a VXLAN tenant or network port.

### *CLI Command*

To display the number of ports that have MACsec enabled and the maximum number of ports allowed per slot, use the following command:

```
show macsec ports usage
```

```
show macsec usage
```

## Auto-Discovery for Universal Hardware

Auto-Discovery automatically detects cable types inserted into the U1 and U2 stacking port, and adjusts the configured speed of the port. Detection of stacking cables is performed during startup of the



switch. Auto-Discovery is supported on ExtremeSwitching 5420 and 5520 series switches beginning in ExtremeXOS 31.5.

Auto-discovery operates on stack ports U1 and U2 on both 5420 and 5520 series switches. On 5420 series switches, the stack ports support either SFP+ or SFP-DD type cables. On 5520 series switches, the stack ports only support QSFP+ type cables.

For example, if a 5420 series switch is configured for Native V40 stacking and auto-discovery detects an SFP-DD cable present in either the U1 or U2 stack ports during start up, the stack port speed is automatically reconfigured for Native V80 (to match the speed of the SFP-DD cable).



#### Important

Changing the stacking cables on an operational stack to achieve a different stack speed requires a reboot.

#### Supported Platforms

Auto-Discovery for Universal Hardware is supported on ExtremeSwitching 5420 and 5520 series switches.

#### CLI Command

Auto-Discovery is enabled by default on the ExtremeSwitching 5420 and 5520 Series switches. Use the `configure stacking-support auto-discovery [disable]` command to disable Auto-Discovery for Universal Hardware.



#### Note

Auto-Discovery is automatically re-enabled whenever the Universal Hardware is restored back to the factory configuration when the `unconfigure switch all` command is used.

## DHCP Security Support for MLAG Controlling Bridges

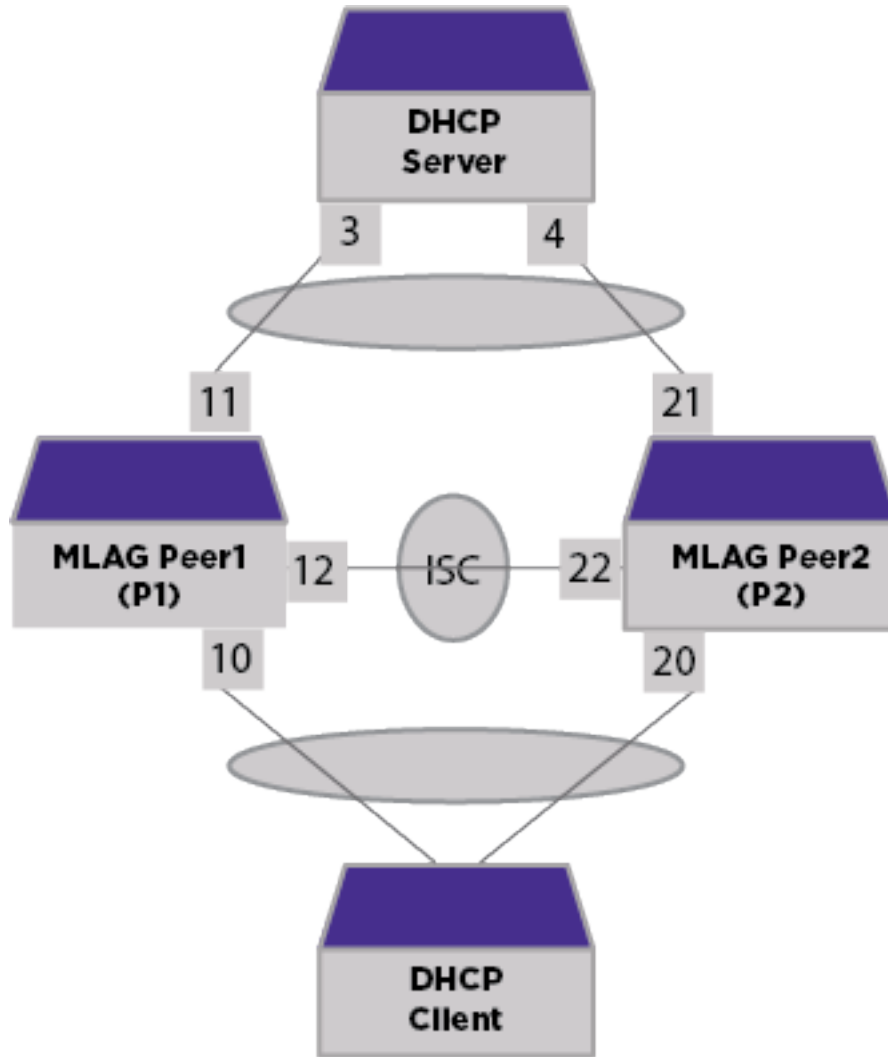
DHCP Security Support for MLAG Controlling Bridge implements the checkpointing of DHCP snooping entries and DHCP and ARP violations between MLAG peers. This allows IP security to share the data or state required for its features, and to exhibit identical behavior in the MLAG topology.



#### Note

DHCP security for MLAG controlling bridges is also supported in VPEX and W-MLAG topologies.

In a typical deployment, a DHCP snooping entry is captured in MLAG Peer1 when it receives a DHCP ACK packet from the DHCP server and forwards it to the DHCP client. The DHCP snoop entry is then checkpointed to MLAG Peer2 as soon as it is received by the IP security module. This ensures redundancy and identical functional behavior in MLAG Peer2 when MLAG Peer1 goes down for any reason:



**Figure 1: MLAG Topology**

#### *MLAG Checkpointing*

Once Inter-Switch Connection (ISC) connectivity between the MLAG peers is established, IP security begins checkpointing DHCP snooping and DHCP or ARP violation actions. As long as MLAG peers have ISC connectivity, addition and deletion of entries/data will be checkpointed. The checkpoint is only done for MLAG ports.

#### *DHCP Snoop Checkpointing*

When a DHCP snoop entry is checkpointed from Peer1 to Peer2, the receiving peer checks if it has the received DHCP snoop entry present in its DHCP bindings table. If it is a new entry, it will be added to the DHCP binding table with the server ports as ISC ports. The client port is then identified using FDB lookup on the received client MAC. If the receiving entry already exists, the lease time will be updated so that it is in sync with the peer. If the server ports are BPE ports, the checkpoint receiving peer will set to the BPE port as a server instead of an ISC port.

Using the previous configuration example, once a DHCP ACK is received, Peer1 creates a new DHCP snoop entry into its DHCP binding table, with the server port as 11, the client port as 10, and checkpoints

the entry to Peer2. On receiving the checkpoint entry, Peer2 adds the entry to its DHCP binding table with the server port as 22 (ISC port) and the client port as 20 (FDB lookup port).

#### *DHCP and ARP Violation Checkpoint*

DHCP and ARP Violation events - “block-port” and “block-mac” are checkpointed between MLAG peers for front panel ports. However, violation actions are not applied at the receiving peer. The receiving peer stores the block action, block duration internally, and applies the checkpointed block time (violationTime - lapsedTime) once a similar violation occurs. For example, if Peer1 receives a MAC violation on MAC “00:04:96:97:fa:a2”, then IP security will block the MAC for 300 seconds and checkpoint the information to Peer2. Once the same MAC “00:04:96:97:fa:a2” violation is seen in Peer2 after a period of time, Peer2 will block the MAC for remaining 200 seconds (instead of 300 seconds). This ensures both Peer1 and Peer2 removes or unblocks the violation action at the same time.



#### Tip

With BPE ports, the violation action is also checkpointed and applied in the peer.

#### *Supported Platforms*

ExtremeSwitching X435, X450-G2, X460-G2, X670-G2, X440-G2, X465, X590, X620, X690, X695, X870, 5420, 5520 series switches.

## New Hardware Supported in ExtremeXOS 31.5

ExtremeXOS 31.5 supports SFP-DD cabling on ExtremeSwitching 5420 series switches. The two stacking/SFP-DD ports are “Universal Ethernet” ports, labeled “U1” and “U2.” These ports can operate either as stacking ports or Ethernet ports.

When used as Ethernet ports, the U1 and U2 ports can support data rates of either 10Gb using SFP+ optics or 20Gb using SFP-DD optics. 5420M switch models support two 10Gb channels on each SFP-DD port when the ports are used as Ethernet ports. 5420F switch models support one 10Gb channel on each SFP-DD port when the ports are used as Ethernet ports. Use the **disable stacking-support** command to set the U1 and U2 ports in Ethernet mode.

## Changing the Network Operating System

ExtremeSwitching Universal Hardware switches can run two different operating systems: ExtremeXOS (default) or VOSS.

### Making Your Initial Network Operating System Selection

You can make your initial selection of the operating system using:

- **ExtremeCloud™ IQ** (see [ExtremeCloud IQ Agent Support](#) on page 21)—You can select your network operating system when purchasing your switch, which associates the switch serial number with your desired network operating system, which then causes the desired network operating system to be loaded during ExtremeCloud onboarding. For more information about using ExtremeCloud IQ, go to <https://www.extremenetworks.com/support/documentation/extremecloud-iq/>.
- **Extreme Management Center**— see [Extreme Management Center User Guide](#)

- **Manually during boot-up:**
  - **Bootloader**—When the message Starting Default Bootloader ...Press and hold the <spacebar> to enter the bootrom appears, press and hold the **space bar** until the boot menu appears (you have 30 seconds):

```
*** 5420- Boot Menu ( 2.2.1.3 ) ***

EXOS: Default
EXOS: Primary 31.3..
EXOS: Secondary 31.3..
EXOS: Primary 31.3.. with default configuration
EXOS: Secondary 31.3.. with default configuration
EXOS: Rescue
Change the switch OS to VOSS
Run Manufacturing Diagnostics
Update bootloader
Reboot system
```

Use the **up** and **down** arrow keys to select Change the switch OS to VOSS, and then press **Enter**.

- **Safe defaults mode start-up menu**—When the question Would you like to change the switch OS to VOSS? [y/N/q] appears:
  - For ExtremeXOS, type N.
  - For VOSS, type y.

Continue to log onto the switch. For more information about logging onto the switch, see the [ExtremeXOS 31.5 User Guide](#).

## Changing Your Network Operating System

You can change your network operating system selection at any time.



### Caution

Changing your network operating systems deletes all configuration files, debug information, logs, events, and statistics information of the previous network operating system.



### Note

If you anticipate ever changing the operating system to VOSS, and you want to statically assign IP addresses on the DHCP server, then it is recommended to assign them based on the DHCP client ID. For more information about this issue, see the *Using a BOOTP or DHCP Server* topic in the [ExtremeXOS 31.5 User Guide](#).

- **ExtremeCloud IQ**—See <https://www.extremenetworks.com/support/documentation/extremecloud-iq/>
- **Extreme Management Center**—See [Extreme Management Center User Guide](#)

- **CLI Command**—run the download `[url url {vr vrname} | image [active | inactive] [[hostname | ipaddress] filename {{vr} vrname} {block-size block_size}] {partition} {install {reboot}}` command specifying a VOSS image.



#### Note

Do *not* use the **active**, **inactive**, and **partition** options. They are not applicable for VOSS.

## ExtremeCloud IQ Agent Support

ExtremeXOS 31.5 supports ExtremeCloud IQ. For network administrators looking for unified management of access points, switches, & routers, ExtremeCloud IQ is a cloud-driven network management application that:

- simplifies network operations through an easy to use and intuitive interface, including minimal touch onboarding of devices
- provides ultimate flexibility in deployment choice, cloud platform choice, OS choice
- offers unlimited data duration for more informed networking decisions

This release supports device discovery, basic monitoring, visibility into homogenous stacking, and the ability to configure an optional user-defined virtual router (VR) and address of the server for ExtremeCloud IQ agent to connect to. These values are used instead of any auto-detected values.

For more information about ExtremeCloud IQ, go to <https://www.extremenetworks.com/support/documentation/extremecloud-iq/>.

**Table 6: Supported Platforms**

| Switch Series            | Switch Models  |
|--------------------------|--|
| ExtremeSwitching X435    | X435-8T-4S<br>X435-8P-4S<br>X435-8P-2T-W<br>X435-24T-4S<br>X435-24P-4S   |
| ExtremeSwitching X440-G2 | X440-G2-24P-10GE4<br>X440-G2-48P-10GE4<br>X440-G2-12T-10GE4<br>X440-G2-12P-10GE4<br>X440-G2-24T-10GE4<br>X440-G2-48T-10GE4 |
| ExtremeSwitching X450-G2 | X450-G2-24P-10GE<br>X450-G2-48P-10GE<br>X450-G2-24P-GE4<br>X450-G2-48P-GE4   |
| ExtremeSwitching X460-G2 | X460-G2-24P-10GE4<br>X460-G2-48P-10GE4<br>X460-G2-16MP-32P-10GE4<br>X460-G2-24P-48HP-10GE4                                 |

**Table 6: Supported Platforms (continued)**

| Switch Series         | Switch Models   |
|-----------------------|---|
| ExtremeSwitching X465 | X465-48P<br>X465-24MU-24W<br>X465-24W<br>X465-48W<br>X465-24MU  |
| ExtremeSwitching 5420 | 5420F-8W-16P-4XE<br>5420F-24P-4XE<br>5420F-24S-4XE<br>5420F-24T-4XE<br>5420F-16MW-32P-4XE<br>5420F-16W-32P-4XE<br>5420F-48P-4XE<br>5420F-48P-4XL<br>5420F-48T-4XE<br>5420M-24T-4YE<br>5420M-24W-4YE<br>5420M-16MW-32P-4YE<br>5420M-48T-4YE<br>5420M-48W-4YE |
| ExtremeSwitching 5520 | 5520-24T<br>5520-24W<br>5520-48T<br>5520-48W<br>5520-12MW-36W<br>5520-24X<br>5520-48SE  |

## Extreme Hardware/Software Compatibility and Recommendation Matrices

The *Summit, ExtremeSwitching, and E4G Components: ExtremeXOS Software Support* provide information about the minimum version of ExtremeXOS software required to support switches.

The Extreme Optics Compatibility website displays supported hardware platforms, technical specifications, and usage considerations for pluggable optical devices (transceivers and cables) used in all Extreme Networks operating environments. To access the site, open <https://optics.extremenetworks.com/EXOS/> in a web browser.

To find the recommended EXOS releases for EXOS-based hardware platforms, see *ExtremeXOS Release Recommendations*.

The latest versions of this and other ExtremeXOS guides are at: [www.extremenetworks.com/documentation/](http://www.extremenetworks.com/documentation/).

## Compatibility with Extreme Management Center and ExtremeCloud™ IQ - Site Engine

ExtremeXOS 31.5 is compatible with the version of Extreme Management Center as shown in this table: [http://emc.extremenetworks.com/content/common/releasenotes/extended\\_firmware\\_support.htm](http://emc.extremenetworks.com/content/common/releasenotes/extended_firmware_support.htm)

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## Supported MIBs

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The Extreme Networks management information bases (MIBs) are located at [www.extremenetworks.com/support/policies/mibs/](http://www.extremenetworks.com/support/policies/mibs/).

When you provide your serial number or agreement number, the MIBs are available under each release.

For detailed information on which MIBs and SNMP traps are supported, see the *Extreme Networks Proprietary MIBs* and *MIB Support Details* sections in the [ExtremeXOS 31.5 User Guide](#).

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## Tested Third-Party Products

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The following third-party products have been tested for ExtremeXOS 31.5.

### 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)

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## Extreme Switch Security Assessment

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### 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





# Limits

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[Limits Overview](#) on page 25

[Value Edge License Limits](#) on page 27

[Edge and Base License Limits](#) on page 39

[Advanced Edge and Base License Limits](#) on page 69

[Core and Premier License Limits](#) on page 77

[Notes for Limits Tables](#) on page 82

This chapter summarizes the supported limits in ExtremeXOS 31.5.

## Limits Overview

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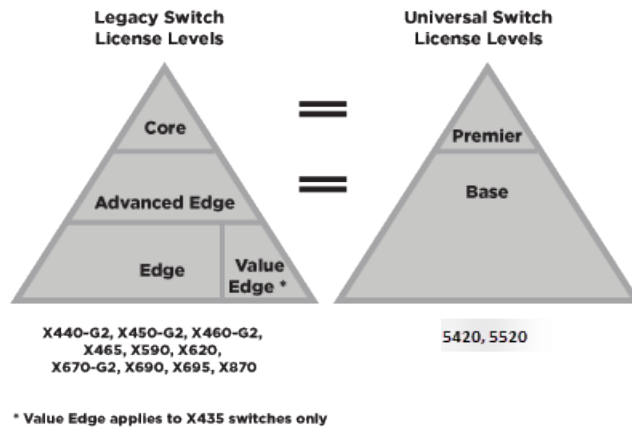
The limits data is grouped by license level that contains the associated features:

- [Value Edge License Limits](#) on page 27
- [Edge and Base License Limits](#) on page 39
- [Advanced Edge and Base License Limits](#) on page 69
- [Core and Premier License Limits](#) on page 77

The ExtremeSwitching family of switches includes two categories of switches with different license levels:

| Switch Category  | Switches   | Applicable License Levels               |
|--|--|---|
| Non-universal switches   | X435 *, X440-G2, X450-G2, X460-G2, X465, X590, X620, X670-G2, X690, X695, X870 | Value Edge *, Edge, Advanced Edge, Core |
| Universal hardware switches  | 5420, 5520   | Base, Premier                           |
| <b>Note:</b> * The X435 is the only switch that supports the Value Edge license level. |  |   |

The following figure illustrates that each license level builds on the features of the license level below it. For example, the Advanced Edge license includes all of the features in the Edge license, plus the features in the Advance Edge license level.



## Figure 2: License Levels for Legacy and Universal Switches

The non-universal and universal switch license levels correlate in the following way:

Premier = Core

Base = Advanced Edge + AVB

For more information about licenses, see [ExtremeXOS 31.5 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, Extended Edge Switching X670-G2 series switches) in use. For applicable limits, see the following tables for the controlling bridge you are using.

## Value Edge License Limits

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

**Table 7: Supported Limits for Value Edge License**

| Metric  | Product               | Limit                     |
|---|-----------------------|---------------------------|
| <b>AAA (local)</b> —maximum number of admin and local user accounts.                          | ExtremeSwitching X435 | 16                        |
| <b>Access lists (meters)</b> —maximum number of meters.                                       | ExtremeSwitching X435 | 512 ingress               |
| <b>Access lists (policies)</b> —suggested maximum number of lines in a single policy file.    | ExtremeSwitching X435 | 300,000                   |
| <b>Access lists (policies)</b> —maximum number of rules in a single policy file. <sup>a</sup> | ExtremeSwitching X435 | 1,024 ingress<br>0 egress |
| <b>Access lists (slices)</b> —number of ACL slices.   | ExtremeSwitching X435 | 8 ingress only            |
| <b>ACL Per Port Meters</b> —number of meters supported per port.                              | ExtremeSwitching X435 | 8                         |
| <b>ACL port ranges</b>  | ExtremeSwitching X435 | 32                        |
| <b>Meters Packets-Per-Second Capable</b>  | ExtremeSwitching X435 | Yes                       |
| <b>AVB (audio video bridging)</b> —maximum number of active streams.                          | ExtremeSwitching X435 | 512                       |
| <b>BOOTP/DHCP relay</b> —maximum number of BOOTP or DHCP servers per virtual router.          | ExtremeSwitching X435 | 8                         |
| <b>BOOTP/DHCP relay</b> —maximum number of BOOTP or DHCP servers per VLAN.                    | ExtremeSwitching X435 | 8                         |
| <b>BOOTP/DHCP relay</b> —maximum number of DHCPv4/v6 relay agents.                            | ExtremeSwitching X435 | 30                        |
| <b>Connectivity fault management (CFM)</b> —maximum number of CFM domains.                    | ExtremeSwitching X435 | 8                         |
| <b>CFM</b> —maximum number of CFM associations.   | ExtremeSwitching X435 | 256                       |
| <b>CFM</b> —maximum number of CFM up end points.  | ExtremeSwitching X435 | 32                        |
| <b>CFM</b> —maximum number of CFM down end points.  | ExtremeSwitching X435 | 32                        |

**Table 7: Supported Limits for Value Edge License (continued)**

| Metric   | Product  | Limit                   |
|--|--|-------------------------|
| CFM—maximum number of CFM remote end points per up/down end point.   | ExtremeSwitching X435                                    | 2,000                   |
| CFM—maximum number of dot1ag ports.  | ExtremeSwitching X435                                    | 128                     |
| CFM—maximum number of CFM segments.  | ExtremeSwitching X435                                    | 1,000                   |
| CFM—maximum number of MIPs.  | ExtremeSwitching X435                                    | 256                     |
| <b>DHCPv6 Prefix Delegation Snooping</b> —Maximum number of DHCPv6 prefix delegation snooped entries.        | ExtremeSwitching X435                                    | 30 (with static routes) |
| <b>DHCP snooping entries</b> —maximum number of DHCP snooping entries.                                       | ExtremeSwitching X435                                    | 30                      |
| <b>Dynamic ACLs</b> —maximum number of ACLs processed per second.<br><b>Note:</b> Limits are load-dependent. | ExtremeSwitching X435<br>with 50 DACLs<br>with 500 DACLs | 10<br>5                 |
| <b>EAPS domains</b> —maximum number of EAPS domains.   | ExtremeSwitching X435                                    | 4                       |
| <b>EAPSV1 protected VLANs</b> —maximum number of protected VLANs.  | ExtremeSwitching X435                                    | 1,000                   |
| <b>ERPS domains</b> —maximum number of ERPS domains with or without CFM configured.                          | ExtremeSwitching X435                                    | 4                       |
| <b>ERPSV1 protected VLANs</b> —maximum number of protected VLANs.  | ExtremeSwitching X435                                    | 1,000                   |
| <b>ELSM (vlan-ports)</b> —maximum number of VLAN ports.  | ExtremeSwitching X435                                    | 2,000                   |
| <b>Forwarding rate</b> —maximum L3 software forwarding rate.   | ExtremeSwitching X435                                    | 9,000 pps               |
| <b>FDB (unicast blackhole entries)</b> —maximum number of unicast blackhole FDB entries.                     | ExtremeSwitching X435                                    | 16,019                  |
| <b>FDB (multicast blackhole entries)</b> —maximum number of multicast blackhole FDB entries.                 | ExtremeSwitching X435                                    | 16,384                  |
| <b>FDB (maximum L2 entries)</b> —maximum number of MAC addresses.  | ExtremeSwitching X435                                    | 16,384 <sup>9</sup>     |

**Table 7: Supported Limits for Value Edge License (continued)**

| Metric   | Product               | Limit |
|--|-----------------------|-------|
| <b>FDB (maximum L2 entries)</b> —maximum number of multicast FDB entries.  | ExtremeSwitching X435 | 512   |
| <b>Identity management</b> —maximum number of Blacklist entries.   | ExtremeSwitching X435 | 512   |
| <b>Identity management</b> —maximum number of Whitelist entries.   | ExtremeSwitching X435 | 512   |
| <b>Identity management</b> —maximum number of roles that can be created.   | ExtremeSwitching X435 | 64    |
| <b>Identity management</b> —maximum role hierarchy depth allowed.  | ExtremeSwitching X435 | 5     |
| <b>Identity management</b> —maximum number of attribute value pairs in a role match criteria.  | ExtremeSwitching X435 | 16    |
| <b>Identity management</b> —maximum number of child roles for a role.  | ExtremeSwitching X435 | 8     |
| <b>Identity management</b> —maximum number of policies/dynamic ACLs that can be configured per role.   | ExtremeSwitching X435 | 8     |
| <b>Identity management</b> —maximum number of LDAP servers that can be configured.   | ExtremeSwitching X435 | 8     |
| <b>Identity management</b> —maximum number of Kerberos servers that can be configured.   | ExtremeSwitching X435 | 20    |
| <b>Identity management</b> —maximum database memory size.  | ExtremeSwitching X435 | 512   |
| <b>Identity management</b> —recommended number of identities per switch.<br><br><b>Note:</b> Number of identities per switch is for a default identity management database size (512 Kbytes) across all platforms. | ExtremeSwitching X435 | 100   |
| <b>Identity management</b> —recommended number of ACL entries per identity.<br><br><b>Note:</b> Number of ACLs per identity, based on system ACL limitation.   | ExtremeSwitching X435 | 20    |

**Table 7: Supported Limits for Value Edge License (continued)**

| Metric  | Product               | Limit            |
|---|-----------------------|------------------|
| <b>Identity management</b> —maximum number of dynamic ACL entries configured as an individual dynamic rule, or as an ACL entry in a policy file.  | ExtremeSwitching X435 | 500              |
| <b>IGMP snooping per VLAN filters</b> —maximum number of VLANs supported in per-VLAN IGMP snooping mode.  | ExtremeSwitching X435 | 500              |
| <b>IGMPv2 subscriber</b> —maximum number of IGMPv2 subscribers per port. <sup>n</sup>   | ExtremeSwitching X435 | 2,500            |
| <b>IGMPv2 subscriber</b> —maximum number of IGMPv2 subscribers per switch. <sup>n</sup>   | ExtremeSwitching X435 | 12,500           |
| <b>IGMPv3 maximum source per group</b> —maximum number of source addresses per group.   | ExtremeSwitching X435 | 250              |
| <b>IGMPv3 subscriber</b> —maximum number of IGMPv3 subscribers per port. <sup>n</sup>   | ExtremeSwitching X435 | 1,000            |
| <b>IGMPv3 subscriber</b> —maximum number of IGMPv3 subscribers per switch. <sup>n</sup>   | ExtremeSwitching X435 | 10,000           |
| <b>IP ARP entries in software</b> —maximum number of IP ARP entries in software.<br><br><b>Note:</b> Might be limited by hardware capacity of FDB (maximum L2 entries).   | ExtremeSwitching X435 | 20,424           |
| <b>IPv4 ARP entries in hardware with minimum LPM routes</b> —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 X435 | 509 <sup>h</sup> |
| <b>IPv4 ARP entries in hardware with maximum LPM routes</b> —maximum recommended number of IPv4 ARP entries in hardware, with maximum LPM routes present. Assumes number of IP route reserved entries is “maximum.”   | ExtremeSwitching X435 | 500 <sup>h</sup> |

**Table 7: Supported Limits for Value Edge License (continued)**

| Metric  | Product               | Limit              |
|---|-----------------------|--------------------|
| <b>IPv4 remote hosts in hardware with zero LPM routes</b> —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 X435 | 3,100 <sup>h</sup> |
| <b>IPv4 routes</b> —maximum number of static IPv4 routes in software (combination of unicast and multicast routes).   | ExtremeSwitching X435 | 32                 |
| <b>IPv4 routes (LPM entries in hardware)</b> — number of IPv4 routes in hardware.   | ExtremeSwitching X435 | 32                 |
| <b>IPv6 addresses on an interface</b> —maximum number of IPv6 addresses on an interface.  | ExtremeSwitching X435 | 15                 |
| <b>IPv6 addresses on a switch</b> —maximum number of IPv6 addresses on a switch.  | ExtremeSwitching X435 | 15                 |
| <b>IPv6 host entries in hardware</b> —maximum number of IPv6 neighbor entries in hardware.  | ExtremeSwitching X435 | 500                |
| <b>IPv6 routes in software</b> —maximum number of static IPv6 routes in software.   | ExtremeSwitching X435 | 16                 |
| <b>IPv6 routes (LPM entries in hardware)</b> —maximum number of IPv6 routes in hardware.  | ExtremeSwitching X435 | 16                 |
| <b>IP router interfaces</b> —maximum number of VLANs performing IPv4 and/or IPv6 routing. Excludes sub-VLANs.   | ExtremeSwitching X435 | 30                 |
| <b>IP unicast static routes</b> —maximum number of permanent IP unicast routes.   | ExtremeSwitching X435 | 32                 |
| <b>IP multinetting (secondary IP addresses)</b> —maximum number of secondary IP addresses per VLAN.   | ExtremeSwitching X435 | 30                 |
| <b>Jumbo frames</b> —maximum size supported for jumbo frames, including the CRC.  | ExtremeSwitching X435 | 9,216              |

**Table 7: Supported Limits for Value Edge License (continued)**

| Metric   | Product               | Limit |
|--|-----------------------|-------|
| <p><b>Layer-2 IPMC forwarding caches</b>—(IGMP/MLD/PIM snooping) in mac-vlan mode.</p> <p><b>Note:</b></p> <ul style="list-style-type: none"> <li>• The internal lookup table configuration used is "I2-and-I3".</li> <li>• IPv6 and IPv4 L2 IPMC scaling is the same for this mode.</li> <li>• Layer-2 IPMC forwarding cache limits—(IGMP/MLD/PIM snooping) in mixed-mode are the same.</li> </ul>  | ExtremeSwitching X435 | 5,000 |
| <p><b>Layer-3 IPv4 Multicast</b>—maximum number of &lt;S,G,V&gt; entries installed in the hardware (IP multicast compression enabled).</p> <p><b>Note:</b></p> <ul style="list-style-type: none"> <li>• Limit value is the same for MVR senders, PIM Snooping entries, PIM SSM cache, IGMP senders, PIM cache.</li> <li>• Assumes source-group-vlan mode as look up key.</li> <li>• Layer 3 IPMC cache limit in mixed mode also has the same value.</li> </ul> | ExtremeSwitching X435 | 1,500 |
| <p><b>Layer-3 IPv6 Multicast</b>—maximum number of &lt;S,G,V&gt; entries installed in the hardware (IP multicast compression enabled).</p> <p><b>Note:</b></p> <ul style="list-style-type: none"> <li>• Limit value is the same for MLD sender per switch, PIM IPv6 cache.</li> <li>• Assumes source-group-vlan mode as lookup key.</li> </ul>   | ExtremeSwitching X435 | 700   |



**Table 7: Supported Limits for Value Edge License (continued)**

| Metric   | Product                                 | Limit  |
|--|---|--|
| <p><b>Load sharing</b>—maximum number of load sharing groups.</p> <p><b>Note:</b> 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.</p> | ExtremeSwitching X435                   | 8  |
| <p><b>Load sharing</b>—maximum number of ports per load-sharing group.</p>   | ExtremeSwitching X435 (standalone only) | 8  |
| <p><b>Logged messages</b>—maximum number of messages logged locally on the system.</p>   | ExtremeSwitching X435                   | 20,000   |
| <p><b>MAC-based security</b>—maximum number of MAC-based security policies.</p>  | ExtremeSwitching X435                   | 1,024  |
| <p><b>MAC Locking</b>—Maximum number of MAC locking stations that can be learned on a port.</p>  | ExtremeSwitching X435                   | 64 (static MAC locking stations)<br>600 (first arrival MAC locking stations) |
| <p><b>Meters</b>—maximum number of meters.</p>   | ExtremeSwitching X435                   | 512  |
| <p><b>Maximum mirroring instances.</b></p>   | ExtremeSwitching X435                   | 1 (egress)   |
| <p><b>Mirroring (filters)</b>—maximum number of mirroring filters.</p> <p><b>Note:</b> This is the number of filters across all the active mirroring instances.</p>  | ExtremeSwitching X435                   | 128  |
| <p><b>Mirroring, one-to-many (filters)</b>—maximum number of one-to-many mirroring filters.</p> <p><b>Note:</b> This is the number of filters across all the active mirroring instances.</p>   | ExtremeSwitching X435                   | 128  |
| <p><b>Mirroring, one-to-many (monitor port)</b>—maximum number of one-to-many monitor ports.</p>   | ExtremeSwitching X435                   | 1  |

**Table 7: Supported Limits for Value Edge License (continued)**

| Metric  | Product               | Limit                           |
|---|-----------------------|---------------------------------|
| <b>Multicast listener discovery (MLD) snooping per-VLAN filters</b> —maximum number of VLANs supported in per-VLAN MLD snooping mode. | ExtremeSwitching X435 | 63                              |
| <b>Multicast listener discovery (MLD)v1 subscribers</b> —maximum number of MLDv1 subscribers per port. <sup>n</sup>                   | ExtremeSwitching X435 | 2,500                           |
| <b>Multicast listener discovery (MLD)v1 subscribers</b> —maximum number of MLDv1 subscribers per switch. <sup>n</sup>                 | ExtremeSwitching X435 | 12,500                          |
| <b>Multicast listener discovery (MLD)v2 subscribers</b> —maximum number of MLDv2 subscribers per port. <sup>n</sup>                   | ExtremeSwitching X435 | 2,000                           |
| <b>Multicast listener discovery (MLD)v2 subscribers</b> —maximum number of MLDv2 subscribers per switch. <sup>n</sup>                 | ExtremeSwitching X435 | 10,000                          |
| <b>Multicast listener discovery (MLD)v2 maximum source per group</b> —maximum number of source addresses per group.                   | ExtremeSwitching X435 | 200                             |
| <b>Network Login</b> —maximum number of clients being authenticated on MAC-based VLAN enabled ports.                                  | ExtremeSwitching X435 | 1,024                           |
| <b>Network Login</b> —maximum number of dynamic VLANs.  | ExtremeSwitching X435 | 1,024                           |
| <b>Network Login VLAN VSAs</b> —maximum number of VLANs a client can be authenticated on at any given time.                           | ExtremeSwitching X435 | 10                              |
| <b>Network Service Identifiers (NSI)/VLAN mappings</b> —maximum number of VLANs to NSI mappings.                                      | ExtremeSwitching X435 | 94                              |
| <b>ONEPolicy Roles/Profiles</b> —maximum number of policy roles/profiles.   | ExtremeSwitching X435 | 63                              |
| <b>ONEPolicy Rules per Role/Profile</b> —maximum number of rules per role/policy.   | ExtremeSwitching X435 | IPv4 Rules: 128<br>L2 Rules: 56 |

**Table 7: Supported Limits for Value Edge License (continued)**

| Metric   | Product               | Limit            |
|--|-----------------------|------------------|
| <b>ONEPolicy Authenticated Users per Switch</b> —maximum number of authenticated users per switch with TCI-Overwrite disabled.<br><br><b>Note:</b> The maximum values assume 75% utilization of VLAN-XLATE hash table.   | ExtremeSwitching X435 | 192              |
| <b>ONEPolicy Authenticated Users per Port per Switch</b> — maximum number of authenticated users per port per switch with TCI overwrite disabled.<br><br><b>Note:</b> The maximum values assume 75% utilization of VLAN-XLATE hash table.                                | ExtremeSwitching X435 | 187              |
| <b>ONEPolicy Permit/Deny Traffic Classification Rules Types</b> —total maximum number of unique permit/deny traffic classification rules types (system/stack).   | ExtremeSwitching X435 | 184              |
| <b>ONEPolicy Permit/Deny Traffic Classification Rules Types</b> — maximum number of unique IPv4 permit/deny traffic classification rules (typesipsource / ipdest / ipfrag / udpsourceportIP / udpdestportIP / tcpsourceportIP / tcpdestportIP / ipttl / iptos / iptype). | ExtremeSwitching X435 | 128              |
| <b>ONEPolicy Permit/Deny Traffic Classification Rules Types</b> — maximum number of unique Layer 2 permit/deny traffic classification rules (ethertype/port).  | ExtremeSwitching X435 | 56               |
| <b>Policy-based routing (PBR) redundancy</b> —maximum number of flow-redirects.  | ExtremeSwitching X435 | 256 <sup>o</sup> |
| <b>Policy-based routing (PBR) redundancy</b> —maximum number of next hops per each flow-direct.  | ExtremeSwitching X435 | 32 <sup>o</sup>  |
| <b>Private VLANs</b> —maximum number of subscribers. Assumes a minimum of one port per network and subscriber VLAN.  | ExtremeSwitching X435 | 15               |

**Table 7: Supported Limits for Value Edge License (continued)**

| Metric   | Product               | Limit  |
|--|-----------------------|--------|
| <p><b>Private VLANs</b>—maximum number of private VLANs with an IP address on the network VLAN.</p> <p><b>Note:</b> This limit is dependent on the maximum number of private VLANs in an L2-only environment if the configuration has tagged and translated ports.</p>   | ExtremeSwitching X435 | 15     |
| <p><b>Private VLANs</b>—maximum number of private VLANs in an L2-only environment.</p>   | ExtremeSwitching X435 | 15     |
| <p><b>Route policies</b>—suggested maximum number of lines in a route policy file.</p>   | ExtremeSwitching X435 | 10,000 |
| <p><b>Spanning Tree (maximum STPDs)</b>—maximum number of Spanning Tree Domains on port mode EMISTP.</p>   | ExtremeSwitching X435 | 16     |
| <p><b>Spanning Tree PVST+</b>—maximum number of port mode PVST domains.</p> <p><b>Note:</b> 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, ExtremeSwitching 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).</p> | ExtremeSwitching X435 | 128    |
| <p><b>Spanning Tree</b>—maximum number of multiple spanning tree instances (MSTI) domains.</p>   | ExtremeSwitching X435 | 16     |
| <p><b>Spanning Tree</b>—maximum number of VLANs per MSTI.</p> <p><b>Note:</b> Maximum number of 10 active ports per VLAN when all 100 VLANs are in one MSTI.</p>   | ExtremeSwitching X435 | 100    |
| <p><b>Spanning Tree</b>—maximum number of VLANs on all MSTP instances.</p>   | ExtremeSwitching X435 | 256    |

**Table 7: Supported Limits for Value Edge License (continued)**

| Metric  | Product               | Limit                |
|---|-----------------------|----------------------|
| <b>Spanning Tree (802.1d domains)</b> —maximum number of 802.1d domains per port.   | ExtremeSwitching X435 | 1                    |
| <b>Spanning Tree (number of ports)</b> —maximum number of ports including all Spanning Tree domains.  | ExtremeSwitching X435 | 1,024                |
| <b>Spanning Tree (maximum VLANs)</b> —maximum number of STP-protected VLANs (dot1d and dot1w).  | ExtremeSwitching X435 | 256                  |
| <b>SSH (number of sessions)</b> —maximum number of simultaneous SSH sessions.   | ExtremeSwitching X435 | 8                    |
| <b>Static MAC multicast FDB entries</b> —maximum number of permanent multicast MAC entries configured into the FDB.   | ExtremeSwitching X435 | 1,024                |
| <b>Syslog servers</b> —maximum number of simultaneous Syslog servers that are supported.  | ExtremeSwitching X435 | 16                   |
| <b>Syslog targets</b> —maximum number of configurable Syslog targets.   | ExtremeSwitching X435 | 16                   |
| <b>Telnet (number of sessions)</b> —maximum number of simultaneous Telnet sessions.   | ExtremeSwitching X435 | 8                    |
| <b>Virtual routers</b> —maximum number of user-created virtual routers that can be created on a switch.   | ExtremeSwitching X435 | 16 (local-only VRs)  |
| <b>Virtual router forwarding (VRFs)</b> —maximum number of VRFs that can be created on a switch.<br><br><b>Note:</b> * Subject to other system limitations. | ExtremeSwitching X435 | 16 (local-only VRFs) |
| <b>VLAN aggregation</b> —maximum number of port-VLAN combinations on any one superVLAN and all of its subVLANs.   | ExtremeSwitching X435 | 1,000                |
| <b>VLANs</b> —includes all VLANs.   | ExtremeSwitching X435 | 4,094                |
| <b>VLANs (Layer 2)</b> —maximum number of Layer 2 VLANs.  | ExtremeSwitching X435 | 4,094                |

**Table 7: Supported Limits for Value Edge License (continued)**

| Metric   | Product               | Limit                |
|--|-----------------------|----------------------|
| <b>VLANs (Layer 3)</b> —maximum number of VLANs performing IPv4 and/or IPv6 routing. Excludes sub-VLANs.   | ExtremeSwitching X435 | IPv4: 30<br>IPv6: 15 |
| <b>VLANs (maximum active port-based)</b> —maximum active ports per VLAN when 1,000 VLANs are configured with default license.  | ExtremeSwitching X435 | 28                   |
| <b>VLAN Port Interfaces (VPIF)</b> —maximum number of VLAN port interfaces.  | ExtremeSwitching X435 | 4,090                |
| <b>VLANs (maximum active protocol-sensitive filters)</b> —number of simultaneously active protocol filters in the switch.  | ExtremeSwitching X435 | 16                   |
| <b>VLAN translation</b> —maximum number of translation VLANs. Assumes a minimum of one port per translation and member VLAN.   | ExtremeSwitching X435 | 15                   |
| <b>VLAN translation</b> —maximum number of translation VLAN pairs with an IP address on the translation VLAN.<br><br><b>Note:</b> This limit is dependent on the maximum number of translation VLAN pairs in an L2-only environment if the configuration includes tagged and translated ports. | ExtremeSwitching X435 | 15                   |
| <b>VLAN translation</b> —maximum number of translation VLAN pairs in an L2-only environment.   | ExtremeSwitching X435 | 15                   |
| <b>VMAN CEP</b> —maximum number of CVIDs.  | ExtremeSwitching X435 | 192                  |
| <b>XML requests</b> —maximum number of XML requests per second.<br><br><b>Note:</b> Limits are dependent on load and type of XML request. These values are dynamic ACL data requests.  | ExtremeSwitching X435 | 10 with 100<br>DACLS |

## Edge and Base License Limits

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

**Table 8: Supported Limits for Edge and Base License**

| Metric  | Product                                    | Limit  |
|---|--|--|
| <b>AAA (local)</b> —maximum number of admin and local user accounts.                          | All platforms, except X435                 | 16   |
| <b>Access lists (meters)</b> —maximum number of meters.                                       | ExtremeSwitching X620, X440-G2             | 1,024 ingress<br>256 egress  |
|   | ExtremeSwitching X670-G2, X450-G2, X460-G2 | 1,024 ingress<br>512 egress  |
|   | ExtremeSwitching X870, X690, X590, X465    | 2,048 ingress<br>512 egress  |
|   | ExtremeSwitching X695                      | 6,000 ingress<br>2,000 egress  |
|   | ExtremeSwitching 5420                      | 3,000 ingress<br>1024 egress   |
|   | ExtremeSwitching 5520                      | 6,144 ingress<br>512 egress  |
| <b>Access lists (policies)</b> —suggested maximum number of lines in a single policy file.    | All platforms, except X435                 | 300,000  |
|   | ExtremeSwitching 5420, 5520                | N/A  |
| <b>Access lists (policies)</b> —maximum number of rules in a single policy file. <sup>a</sup> | ExtremeSwitching X460-G2, X450-G2, X670-G2 | 4,096 ingress<br>1,024 egress  |
|   | ExtremeSwitching X620, X440-G2             | 2,048 ingress<br>512 egress  |
|   | ExtremeSwitching X870                      | 3,072 ingress<br>1,024 egress  |
|   | ExtremeSwitching X690, X590, X465, X695    | 8,192 ingress<br>1,024 egress  |
|   | ExtremeSwitching 5420M                     | 18,000 (rules double-wide (160-bit)) ingress<br>36,000 (rules single-wide (80-bit, default)) ingress<br>1,024 egress |
|   | ExtremeSwitching 5420F                     | 8,000 (rules double-wide (160-bit)) ingress<br>16,000 (rules single-wide (80-bit, default)) ingress<br>1,024 egress  |
|   | ExtremeSwitching 5520                      | 9,216 ingress<br>1,024 egress  |

**Table 8: Supported Limits for Edge and Base License (continued)**

| Metric  | Product  | Limit                  |
|---|--|------------------------|
| <b>Access lists (policies)</b> —maximum number of rules in a single policy file in first stage (VFP). | ExtremeSwitching X450-G2, X460-G2ExtremeSwitching, X590, X465, 5520  | 2,048 ingress only     |
|   | ExtremeSwitching X670-G2, X870, X690, X695, 5420   | 1,024 ingress only     |
|   | ExtremeSwitching X620, X440-G2   | 512 ingress only       |
| <b>Access lists (slices)</b> —number of ACL slices.   | ExtremeSwitching X460-G2, X450-G2  | 16 ingress<br>4 egress |
|   | ExtremeSwitching X670-G2, X690, X590, X465, X695   | 12 ingress<br>4 egress |
|   | ExtremeSwitching X440-G2, X620   | 8 ingress<br>4 egress  |
|   | ExtremeSwitching X870  | 4 ingress<br>4 egress  |
|   | ExtremeSwitching 5420, 5520  | 18 ingress<br>4 egress |
| <b>Access lists (slices)</b> —number of ACL slices in first stage (VFP).                              | ExtremeSwitching X450-G2, X460-G2, X670-G2, X465, X620, X440-G2, X870, X690, X590, X695, 5420, 5520                        | 4 ingress only         |
| <b>ACL Per Port Meters</b> —number of meters supported per port.                                      | ExtremeSwitching X450-G2, X460-G2, X670-G2, X620, X440-G2, X870, X690, X590, X465, X695                                    | 16                     |
|   | ExtremeSwitching 5420, 5520  | 2,048                  |
| <b>ACL port ranges.</b>   | ExtremeSwitching X450-G2, X460-G2, X670-G2, X620, X440-G2, X870, X690, X590, X465, X695, 5420, 5520                        | 32                     |
| <b>Meters Packets-Per-Second Capable.</b>   | ExtremeSwitching X450-G2, X460-G2, X670-G2, X620, X440-G2, X870, X690, X590, X465, X695                                    | Yes                    |
|   | ExtremeSwitching 5420, 5520  | N/A                    |
| <b>AVB (audio video bridging)</b> —maximum number of active streams.                                  | ExtremeSwitching X450-G2, X460-G2, X620, X440-G2, 5420   | 1,024                  |
|   | ExtremeSwitching X465, X670-G2, X695, X870, 5520, X690, X590   | 4,096                  |
| <b>BFD sessions (Software Mode)</b> —maximum number of BFD sessions.                                  | ExtremeSwitching X460-G2, X670-G2, X450-G2, X440-G2, X620, X870, X690, X590, X465, X695, 5420, 5520 (default timers—1 sec) | 512                    |
|   | ExtremeSwitching X460-G2, X670-G2, X450-G2, X440-G2, X620, X870, X690, X590, X465, X695 (minimal timers—100 msec)          | 10 <sup>C</sup>        |



**Table 8: Supported Limits for Edge and Base License (continued)**

| Metric   | Product  | Limit   |
|--|--|---|
| <b>BFD IPv4 sessions (Hardware Assisted)</b> —maximum number of IPv4 BFD sessions.   | ExtremeSwitching X460-G2, X870, X690, X590, X465, X695   | 900 (PTP not enabled)<br>425 (PTP enabled)<br>256 (with 3 ms transmit interval) |
| <b>BFD IPv6 sessions (Hardware Assisted)</b> —maximum number of IPv6 BFD sessions.   | ExtremeSwitching X460-G2, X870, X690, X590, X465, X695   | 425 (PTP not enabled)   |
| <b>BOOTP/DHCP relay</b> —maximum number of BOOTP or DHCP servers per virtual router.   | ExtremeSwitching X460-G2, X670-G2, X450-G2, X440-G2, X465, X620, X870, X690, X590, X695, 5420, 5520                        | 8   |
| <b>BOOTP/DHCP relay</b> —maximum number of BOOTP or DHCP servers per VLAN.   | ExtremeSwitching X460-G2, X670-G2, X450-G2, X440-G2, X465, X620, X870, X690, X590, X695, 5420, 5520                        | 8   |
| <b>BOOTP/DHCP relay</b> —maximum number of DHCPv4/v6 relay agents  | ExtremeSwitching X460-G2, X670-G2, X450-G2, X440-G2, X465, X620, X870, X690, X590, X695, 5420, 5520                        | 4,000   |
| <b>Connectivity fault management (CFM)</b> —maximum number of CFM domains.<br><br><b>Note:</b> With Advanced Edge license or higher. | ExtremeSwitching X460-G2, X670-G2, X450-G2, X440-G2, X620, X870, X690, X590, X465, X695, 5420, 5520                        | 8   |
| <b>CFM</b> —maximum number of CFM associations.<br><br><b>Note:</b> With Advanced Edge license or higher.                            | ExtremeSwitching X460-G2, X670-G2, X450-G2, X440-G2, X620, X870, X690, X590, X465, X695, 5420, 5520                        | 256   |
| <b>CFM</b> —maximum number of CFM up end points.<br><br><b>Note:</b> With Advanced Edge license or higher.                           | ExtremeSwitching X460-G2, X670-G2, X450-G2, X440-G2, X620, X870, X690, X590, X465, X695, 5420, 5520                        | 32  |
| <b>CFM</b> —maximum number of CFM down end points.<br><br><b>Note:</b> With Advanced Edge license or higher.                         | ExtremeSwitching X670-G2, X450-G2, X440-G2, X620, X870, X690, X590, X465, X695, 5420, 5520<br><br>ExtremeSwitching X460-G2 | 32<br><br>256 (non-load shared ports)<br>32 (load shared ports)                 |
| <b>CFM</b> —maximum number of CFM remote end points per up/down end point.<br><br><b>Note:</b> With Advanced Edge license or higher. | ExtremeSwitching X460-G2, X670-G2, X450-G2, X440-G2, X620, X870, X690, X590, X465, X695, 5420, 5520                        | 2,000   |

**Table 8: Supported Limits for Edge and Base License (continued)**

| Metric  | Product   | Limit   |
|---|---|---|
| <b>CFM</b> —maximum number of dot1ag ports.<br><br><b>Note:</b> With Advanced Edge license or higher.   | ExtremeSwitching X460-G2, X670-G2, X450-G2, X440-G2, X620, X870, X690, X590, X465, X695, 5420, 5520 | 128   |
| <b>CFM</b> —maximum number of CFM segments.<br><br><b>Note:</b> With Advanced Edge license or higher.   | ExtremeSwitching X460-G2, X670-G2, X450-G2, X440-G2, X620, X870, X690, X590, X465, X695, 5420, 5520 | 1,000   |
| <b>CFM</b> —maximum number of MIPs.<br><br><b>Note:</b> With Advanced Edge license or higher.   | ExtremeSwitching X460-G2, X670-G2, X450-G2, X620, X440-G2, X870, X690, X590, X465, X695, 5420, 5520 | 256   |
| <b>CLEAR-Flow</b> —total number of rules supported. The ACL rules plus CLEAR-Flow rules must be less than the total number of supported ACLs. | ExtremeSwitching X460-G2, X670-G2, X450-G2  | 4,094   |
|   | ExtremeSwitching X440-G2, X620  | 1,024   |
|   | ExtremeSwitching X870   | 3,072   |
|   | ExtremeSwitching X690, X590, X465, X695, 5420   | 8,192   |
|   | ExtremeSwitching 5520   | 9,215   |
| <b>Data Center Bridging eXchange (DCBX) protocol Type Length Value (TLVs)</b> —maximum number of DCBX application TLVs.                       | ExtremeSwitching X460-G2, X670-G2, X450-G2, X440-G2, X620, X870, X690, X590, X465, X695, 5420, 5520 | 8   |
| <b>DHCPv6 Prefix Delegation Snooping</b> —Maximum number of DHCPv6 prefix delegation snooped entries.   | ExtremeSwitching X460-G2, X670-G2, X450-G2, X620, X440-G2, X870, X690, X590, X465, X695, 5420, 5520 | 256 (with underlying protocol RIPng)<br>128 (with underlying protocol OSPFv3)<br>1,024 (with static routes) |
| <b>DHCP snooping entries</b> —maximum number of DHCP snooping entries.  | ExtremeSwitching X460-G2, X670-G2, X450-G2, X620, X440-G2, X870, X690, X590, X465, X695             | 2,048   |
|   | ExtremeSwitching 5420, 5520   | 2,050   |
| <b>Dynamic ACLs</b> —maximum number of ACLs processed per second.<br><br><b>Note:</b> Limits are load-dependent.                              | ExtremeSwitching X450-G2, X460-G2, X670-G2, X620, X440-G2, X870, X690, X590, X465, X695, 5420, 5520 |   |
|   | with 50 DACLs<br>with 500 DACLs   | 10<br>5   |

**Table 8: Supported Limits for Edge and Base License (continued)**

| Metric   | Product  | Limit  |
|--|--|--|
| <b>EAPS domains</b> —maximum number of EAPS domains.<br><br><b>Note:</b> An EAPS ring that is being spatially reused cannot have more than four configured EAPS domains.<br><br><b>Note:</b> You can increase the number of domains by upgrading to the Advanced Edge license. | ExtremeSwitching X670-G2, X450-G2, X460-G2, X440-G2, X620, X870, X690, X590, X465, X695    | 4  |
|  | ExtremeSwitching 5420, 5520  | 64   |
| <b>EAPSV1 protected VLANs</b> —maximum number of protected VLANs.  | ExtremeSwitching X450-G2, X460-G2, X670-G2, X620, X440-G2                                  | 1,000  |
|  | ExtremeSwitching X870, X690, X590, X465, X695, 5420, 5520                                  | 2,000  |
| <b>ERPS domains</b> —maximum number of ERPS domains with or without CFM configured.<br><br><b>Note:</b> You can increase the number of domains by upgrading to the Advanced Edge license.  | ExtremeSwitching X450-G2, X460-G2, X670-G2, X620, X440-G2, X870, X690, X590, X465, X695    | 4  |
|  | ExtremeSwitching 5420, 5520  | See <a href="#">Advanced Edge and Base License Limits</a> on page 69 |
| <b>ERPSV1 protected VLANs</b> —maximum number of protected VLANs.  | ExtremeSwitching X870, X690, X590, X465, X695, 5420, 5520                                  | 2,000  |
|  | ExtremeSwitching X450-G2, X460-G2, X670-G2, X620, X440-G2                                  | 1,000  |
| <b>ERPSV2 protected VLANs</b> —maximum number of protected VLANs.  | ExtremeSwitching X450-G2, X460-G2, X670-G2, X870, X690, X590, X465, X695, 5420, 5520       | 2,000  |
|  | ExtremeSwitching X620, X440-G2   | 500  |
| <b>ELSM (vlan-ports)</b> —maximum number of VLAN ports.  | ExtremeSwitching X450-G2, X460-G2, X670-G2, X620, X870, X690, X590, X465, X695, 5420, 5520 | 5,000  |
|  | ExtremeSwitching X440-G2   | 4,000  |
| <b>Extended Edge Switching maximum BPEs</b> —maximum number of attached bridge port extenders (BPEs).  | ExtremeSwitching X465, X590, X670-G2, X690, 5520   | 48   |
|  | ExtremeSwitching 5420  | 20   |
| <b>Extended Edge Switching maximum cascade ports</b> —maximum number of upstream ports on bridge port extenders (BPEs).  | ExtremeSwitching X465, X590, X670-G2, X690, 5420, 5520                                     | 2 on V400-24 and V300 models<br>4 on V400-48 models                  |

**Table 8: Supported Limits for Edge and Base License (continued)**

| Metric  | Product  | Limit   |
|---|--|---|
| <b>Extended Edge Switching maximum tiers</b> —maximum number of cascade levels (tiers) of bridge port extenders (BPEs). | ExtremeSwitching X465, X590, X670-G2, X690, 5420, 5520 | 4<br>(except for V300-8P-2T-W, which support 1 tier)        |
| <b>Extended Edge Switching maximum ring BPEs</b> —maximum number of bridge port extenders (BPEs) in a ring topology.    | ExtremeSwitching X465, X590, X670-G2, X690, 5420, 5520 | 8   |
| <b>Extended Edge Switching maximum VLANs</b> —maximum number of VLANs - Includes all VLANs                              | ExtremeSwitching X465, X590, X670-G2, X690, 5520       | 4094  |
|   | ExtremeSwitching 5420                                  | 1024  |
| <b>Extended Edge Switching VLAN+ port memberships</b> —maximum number of VLAN+ (extended) port memberships.             | ExtremeSwitching X465, X590, X670-G2, X690, 5520       | 12,000 in hash mode (default)<br>131,000 in port-group mode |
|   | ExtremeSwitching 5420                                  | 8,750 in hash mode (default)<br>131,617 in port-group mode  |
| <b>Forwarding rate</b> —maximum L3 software forwarding rate.  | ExtremeSwitching X690, X590, X465, X695, 5420, 5520    | 30,000 pps  |
|   | ExtremeSwitching X870                                  | 32,000 pps  |
|   | ExtremeSwitching X450-G2                               | 16,000 pps  |
|   | ExtremeSwitching X460-G2                               | 17,000 pps  |
|   | ExtremeSwitching X620                                  | 10,000 pps  |
|   | ExtremeSwitching X670-G2                               | 15,000 pps  |
|   | ExtremeSwitching X440-G2                               | 9,000 pps   |
| <b>FDB (unicast blackhole entries)</b> —maximum number of unicast blackhole FDB entries.                                | ExtremeSwitching X460-G2                               | 49,152 <sup>f</sup>   |
|   | ExtremeSwitching X670-G2                               | 294,912 <sup>f</sup>  |
|   | ExtremeSwitching X450-G2                               | 34,816 <sup>f</sup>   |
|   | ExtremeSwitching X620, X440-G2                         | 16,384 <sup>f</sup>   |
|   | ExtremeSwitching X870                                  | 139,264 <sup>f</sup>  |
|   | ExtremeSwitching X690, X590, X465                      | 278,528 <sup>f</sup>  |
|   | ExtremeSwitching X695                                  | 294,912 <sup>f</sup>  |
|   | ExtremeSwitching 5420M<br>ExtremeSwitching 5420F       | 65,536<br>32,768 <sup>f</sup>                               |
| ExtremeSwitching 5520   | 114,688 <sup>f</sup>                                   |   |

**Table 8: Supported Limits for Edge and Base License (continued)**

| Metric  | Product   | Limit                         |
|---|---|-------------------------------|
| FDB (multicast blackhole entries)—maximum number of multicast blackhole FDB entries.  | ExtremeSwitching X460-G2, X450-G2, X440-G2, X620  | 1,024                         |
|   | ExtremeSwitching X670-G2, X870, X690, X590, X465, X695, 5520  | 4,096                         |
|   | ExtremeSwitching 5420   | 1024                          |
| FDB (maximum L2 entries)—maximum number of MAC addresses.                             | ExtremeSwitching X460-G2  | 98,300 <sup>g</sup>           |
|   | ExtremeSwitching X670-G2  | 294,912 <sup>g</sup>          |
|   | ExtremeSwitching X450-G2  | 68,000 <sup>g</sup>           |
|   | ExtremeSwitching X620, X440-G2  | 16,384                        |
|   | ExtremeSwitching X870   | 139,264 <sup>g</sup>          |
|   | ExtremeSwitching X690, X590, X465, X695   | 278,528 <sup>g</sup>          |
|   | ExtremeSwitching X695   | 294,912 <sup>g</sup>          |
|   | ExtremeSwitching 5420M<br>ExtremeSwitching 5420F  | 65,536<br>32,768 <sup>g</sup> |
|   | ExtremeSwitching 5520   | 114,688 <sup>g</sup>          |
| FDB (maximum L2 entries)—maximum number of multicast FDB entries.                     | ExtremeSwitching X670-G2, X870, X690, X590, X465, X695, 5520  | 4,096                         |
|   | ExtremeSwitching X450-G2, X460-G2, X620, X440-G2, 5420  | 1,024                         |
| Identity management—maximum number of Blacklist entries.                              | ExtremeSwitching X450-G2, X460-G2, X670-G2, X620, X440-G2, X870, X690, X590, X465, X695, 5420, 5520 | 512                           |
| Identity management—maximum number of Whitelist entries.                              | ExtremeSwitching X450-G2, X460-G2, X670-G2, X620, X440-G2, X870, X690, X590, X465, X695, 5420, 5520 | 512                           |
| Identity management—maximum number of roles that can be created.                      | ExtremeSwitching X450-G2, X460-G2, X670-G2, X620, X440-G2, X870, X690, X590, X465, X695, 5420, 5520 | 64                            |
| Identity management—maximum role hierarchy depth allowed.                             | ExtremeSwitching X450-G2, X460-G2, X670-G2, X620, X440-G2, X870, X690, X590, X465, X695, 5420, 5520 | 5                             |
| Identity management—maximum number of attribute value pairs in a role match criteria. | ExtremeSwitching X450-G2, X460-G2, X670-G2, X620, X440-G2, X870, X690, X590, X465, X695, 5420, 5520 | 16                            |
| Identity management—maximum number of child roles for a role.                         | ExtremeSwitching X450-G2, X460-G2, X670-G2, X620, X440-G2, X870, X690, X590, X465, X695, 5420, 5520 | 8                             |

**Table 8: Supported Limits for Edge and Base License (continued)**

| Metric  | Product   | Limit |
|---|---|-------|
| <b>Identity management</b> —<br>maximum number of policies/<br>dynamic ACLs that can be<br>configured per role.   | ExtremeSwitching X450-G2, X460-G2,<br>X670-G2, X620, X440-G2, X870, X690,<br>X590, X465, X695, 5420, 5520 | 8     |
| <b>Identity management</b> —<br>maximum number of LDAP<br>servers that can be configured.   | ExtremeSwitching X450-G2, X460-G2,<br>X670-G2, X620, X440-G2, X870, X690,<br>X590, X465, X695, 5420, 5520 | 8     |
| <b>Identity management</b> —<br>maximum number of Kerberos<br>servers that can be configured.   | ExtremeSwitching X450-G2, X460-G2,<br>X670-G2, X620, X440-G2, X870, X690,<br>X590, X465, X695, 5420, 5520 | 20    |
| <b>Identity management</b> —<br>maximum database memory<br>size.  | ExtremeSwitching X450-G2, X460-G2,<br>X670-G2, X620, X440-G2, X870, X690,<br>X590, X465, X695, 5420, 5520 | 512   |
| <b>Identity management</b> —<br>recommended number of<br>identities per switch.<br><br><b>Note:</b> Number of identities per<br>switch is for a default identity<br>management database size<br>(512 Kbytes) across all<br>platforms. | ExtremeSwitching X450-G2, X460-G2,<br>X670-G2, X620, X440-G2, X870, X690,<br>X590, X465, X695, 5420, 5520 | 100   |
| <b>Identity management</b> —<br>recommended number of ACL<br>entries per identity.<br><br><b>Note:</b> Number of ACLs per<br>identity, based on system ACL<br>limitation.   | ExtremeSwitching X450-G2, X460-G2,<br>X670-G2, X620, X440-G2, X870, X690,<br>X590, X465, X695, 5520       | 20    |
| <b>Identity management</b> —<br>maximum number of dynamic<br>ACL entries configured as an<br>individual dynamic rule, or as<br>an ACL entry in a policy file.   | ExtremeSwitching X450-G2, X460-G2,<br>X670-G2, X620, X440-G2, X870, X690,<br>X590, X465, X695, 5420, 5520 | 500   |
| <b>IGMP snooping per VLAN filters</b><br>—maximum number of VLANs<br>supported in per-VLAN IGMP<br>snooping mode.   | ExtremeSwitching X460-G2, X870  | 1,500 |
|   | ExtremeSwitching X450-G2  | 2,048 |
|   | ExtremeSwitching X670-G2 , X695   | 2,000 |
|   | ExtremeSwitching X620, X440-G2  | 1,000 |
|   | ExtremeSwitching X690, X590, X465   | 4,000 |
|   | ExtremeSwitching 5420   | 1,500 |
| ExtremeSwitching 5520   | 2,500   |       |

**Table 8: Supported Limits for Edge and Base License (continued)**

| Metric  | Product   | Limit                        |
|---|---|------------------------------|
| <b>IGMPv1/v2 SSM-map entries</b> —maximum number of IGMPv1/v2 SSM mapping entries.  | ExtremeSwitching X450-G2, X460-G2, X670-G2, X620, X440-G2, X870, X690, X590, X465, X695, 5420, 5520       | 500                          |
| <b>IGMPv1/v2 SSM-map entries</b> —maximum number of sources per group in IGMPv1/v2 SSM mapping entries.   | ExtremeSwitching X450-G2, X460-G2, X670-G2, X620, X440-G2, X870, X690, X590, X465, X695, 5420, 5520       | 50                           |
| <b>IGMPv2 subscriber</b> —maximum number of IGMPv2 subscribers per port. <sup>n</sup>   | ExtremeSwitching X870, X690, X590, X465, X695, X670-G2, X460-G2, X450-G2, 5420, 5520                      | 4,000                        |
|   | ExtremeSwitching X440-G2, X620  | 3,500                        |
| <b>IGMPv2 subscriber</b> —maximum number of IGMPv2 subscribers per switch. <sup>n</sup>   | ExtremeSwitching X670-G2  | 30,000                       |
|   | ExtremeSwitching X460-G2, X450-G2, 5420, 5520   | 20,000                       |
|   | ExtremeSwitching X620, X440-G2  | 17,500                       |
|   | ExtremeSwitching X465, X870, X690, X590, X695   | 45,000                       |
| <b>IGMPv3 maximum source per group</b> —maximum number of source addresses per group.   | ExtremeSwitching X450-G2, X460-G2, X670-G2, X770, X620, X440-G2, X870, X690, X590, X465, X695, 5420, 5520 | 250                          |
| <b>IGMPv3 subscriber</b> —maximum number of IGMPv3 subscribers per port. <sup>n</sup>   | ExtremeSwitching X670-G2, X460-G2, X450-G2, 5420, 5520  | 4,000                        |
|   | ExtremeSwitching X440-G2, X620  | 3,500                        |
|   | ExtremeSwitching X870, X690, X590, X465, X695   | 4,000                        |
| <b>IGMPv3 subscriber</b> —maximum number of IGMPv3 subscribers per switch. <sup>n</sup>   | ExtremeSwitching X460-G2, X450-G2, 5420, 5520   | 20,000                       |
|   | ExtremeSwitching X670-G2  | 30,000                       |
|   | ExtremeSwitching X620, X440-G2  | 17,500                       |
|   | ExtremeSwitching X870, X690, X590, X465, X695   | 45,000                       |
| <b>IP ARP entries in software</b> —maximum number of IP ARP entries in software.<br><br><b>Note:</b> Might be limited by hardware capacity of FDB (maximum L2 entries). | ExtremeSwitching X670-G2  | 131,072 (up to) <sup>h</sup> |
|   | ExtremeSwitching X460-G2  | 57,344 (up to) <sup>h</sup>  |
|   | ExtremeSwitching X450-G2  | 47,000 (up to) <sup>h</sup>  |
|   | ExtremeSwitching X440-G2, X620  | 20,480                       |
|   | ExtremeSwitching X870   | 94,206 (up to) <sup>h</sup>  |
|   | ExtremeSwitching X690, X590, X465   | 157,694 (up to) <sup>h</sup> |
|   | ExtremeSwitching X695   | 184,318 (up to) <sup>h</sup> |
|   | ExtremeSwitching 5420, 5520   | 74,750 (up to) <sup>h</sup>  |

**Table 8: Supported Limits for Edge and Base License (continued)**

| Metric  | Product  | Limit                         |
|---|--|-------------------------------|
| IPv4 ARP entries in hardware with minimum LPM routes—maximum recommended number of IPv4 ARP entries in hardware, with minimum LPM routes present. Assumes number of IP route reserved entries is 100 or less. | ExtremeSwitching X870  | 74,000 (up to) <sup>h</sup>   |
|   | ExtremeSwitching X460-G2   | 50,000 (up to) <sup>h</sup>   |
|   | ExtremeSwitching X670-G2   | 108,000 (up to) <sup>h</sup>  |
|   | ExtremeSwitching X450-G2   | 39,000 (up to) <sup>h</sup>   |
|   | ExtremeSwitching X620  | 1,500                         |
|   | ExtremeSwitching X440-G2   | 1,000                         |
|   | ExtremeSwitching X690, X590, X465  | 119,000 (up to) <sup>h</sup>  |
|   | ExtremeSwitching X695  | 146,000 (up to) <sup>h</sup>  |
|   | ExtremeSwitching 5420M models<br>ExtremeSwitching 5420F models                             | 21,000<br>12,000              |
|   | ExtremeSwitching 5520  | 60,000 <sup>h</sup>           |
| 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) <sup>h</sup>   |
|   | ExtremeSwitching X460-G2   | 43,000 (up to) <sup>h</sup>   |
|   | ExtremeSwitching X670-G2   | 98,000 (up to) <sup>h</sup>   |
|   | ExtremeSwitching X450-G2   | 29,000 (up to) <sup>h</sup>   |
|   | ExtremeSwitching X620  | 1,500                         |
|   | ExtremeSwitching X440-G2   | 1,000                         |
|   | ExtremeSwitching X690, X590, X465  | 109,000 (up to) <sup>h</sup>  |
|   | ExtremeSwitching X695  | 125,000 (up to) <sup>h</sup>  |
|   | ExtremeSwitching 5420M models<br>ExtremeSwitching 5420F models                             | 24,000<br>16,000              |
|   | ExtremeSwitching 5520  | 49,000 <sup>h</sup>           |
| IP flow information export (IPFIX)—number of simultaneous flows.  | ExtremeSwitching X460-G2   | 2,048 ingress<br>2,048 egress |
|   | ExtremeSwitching X450-G2, X670-G2, X620, X440-G2, X870, X690, X590, X465, X695, 5420, 5520 | N/A                           |



**Table 8: Supported Limits for Edge and Base License (continued)**

| Metric  | Product   | Limit   |
|---|---|---|
| IPv4 remote hosts in hardware with zero LPM routes—maximum recommended number of IPv4 remote hosts (hosts reachable through a gateway) in hardware when LPM routing is not used. 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) <sup>h</sup>                          |
|   | ExtremeSwitching X460-G2  | 73,000 <sup>h</sup>                                   |
|   | ExtremeSwitching X670-G2  | 176,000 (up to) <sup>h</sup>                          |
|   | ExtremeSwitching X450-G2  | 61,000 (up to) <sup>h</sup>                           |
|   | ExtremeSwitching X440-G2, X620  | 3,500   |
|   | ExtremeSwitching X690, X590, X465   | 216,000 (up to) <sup>h</sup>                          |
|   | ExtremeSwitching X695   | 241,000 (up to) <sup>h</sup>                          |
|   | ExtremeSwitching 5420M<br>ExtremeSwitching 5420F<br>ExtremeSwitching 5520                           | 36,000<br>24,000 <sup>h</sup><br>102,000 <sup>h</sup> |
| IPv4 routes—maximum number of IPv4 routes in software (combination of unicast and multicast routes), including static and from all routing protocols.   | ExtremeSwitching X460-G2, X450-G2, X440-G2, X620  | 25,000  |
|   | ExtremeSwitching X670-G2, X690, X870, X590, X465, X695  | 131,000   |
|   | ExtremeSwitching 5420, 5520   | 81,000  |
| IPv4 routes (LPM entries in hardware)— number of IPv4 routes in hardware.   | ExtremeSwitching X460-G2, 5420  | 12,000  |
|   | ExtremeSwitching X450-G2  | 16,000  |
|   | ExtremeSwitching X670-G2, X690, X870, X590, X465, X695  | 131,000 <sup>q</sup>                                  |
|   | ExtremeSwitching X620, X440-G2  | 480   |
|   | ExtremeSwitching 5520   | 81,000 <sup>q</sup>                                   |
| IPv6 6in4 tunnel—maximum number of IPv6 6in4 tunnels.   | ExtremeSwitching X450-G2, X460-G2, X670-G2, X870, X690, X590, X465, X695, 5420, 5520                | 255   |
|   | ExtremeSwitching X440-G2, X620  | N/A   |
| IPv6 6to4 tunnel—maximum number of IPv6 6to4 tunnels.   | ExtremeSwitching X450-G2, X460-G2, X670-G2, X870, X690, X590, X465, X695, 5420, 5520                | 1 (per virtual router)                                |
|   | ExtremeSwitching X440-G2, X620  | N/A   |
| IPv6 addresses on an interface—maximum number of IPv6 addresses on an interface.  | ExtremeSwitching X450-G2, X460-G2, X670-G2, X620, X440-G2, X870, X690, X590, X465, X695, 5420, 5520 | 255   |
| IPv6 addresses on a switch—maximum number of IPv6 addresses on a switch.  | ExtremeSwitching X670-G2, X460-G2, X450-G2, X870, X690, X590, X465, X695, 5420, 5520                | 2,048   |
|   | ExtremeSwitching X620, X440-G2  | 510   |

**Table 8: Supported Limits for Edge and Base License (continued)**

| Metric  | Product  | Limit                        |
|---|--|------------------------------|
| IPv6 host entries in hardware—maximum number of IPv6 neighbor entries in hardware.  | ExtremeSwitching X670-G2   | 36,750 <sup>h</sup>          |
|   | ExtremeSwitching X460-G2, X870   | 22,000 <sup>h</sup>          |
|   | ExtremeSwitching X450-G2   | 12,000 <sup>h</sup>          |
|   | ExtremeSwitching X440-G2   | 1,000                        |
|   | ExtremeSwitching X620  | 1,500                        |
|   | ExtremeSwitching X690, X590, X465  | 24,500 <sup>s</sup>          |
|   | ExtremeSwitching 5420M models<br>ExtremeSwitching 5420F models           | 12,000<br>6,000              |
|   | ExtremeSwitching 5520  | 18,000 <sup>s</sup>          |
| IPv6 routes in software—maximum number of IPv6 routes in software, including static routes and routes from all routing protocols. | ExtremeSwitching X450-G2, X460-G2, X620, X440-G2                         | 25,000                       |
|   | ExtremeSwitching X670-G2, X690, X870, X590, X465, X695                   | 65,000 <sup>q</sup>          |
|   | ExtremeSwitching 5420, 5520  | 18,000 <sup>q</sup>          |
| IPv6 routes (LPM entries in hardware)—maximum number of IPv6 routes in hardware.  | ExtremeSwitching X460-G2, 5420   | 6,000                        |
|   | ExtremeSwitching X450-G2   | 8,000                        |
|   | ExtremeSwitching X670-G2, X690, X870, X590, X465, X695                   | 65,000 <sup>q</sup>          |
|   | ExtremeSwitching X620, X440-G2   | 240                          |
|   | ExtremeSwitching 5520  | 40,000 <sup>q</sup>          |
| IPv6 routes with a mask greater than 64 bits in hardware—maximum number of such IPv6 LPM routes in hardware.                      | ExtremeSwitching X670-G2, X690, X870, X590, X465, X695, 5520             | 8,192 <sup>r</sup>           |
|   | 5420   | 256                          |
|   | ExtremeSwitching X440-G2, X620   | 1,024                        |
|   | ExtremeSwitching X450-G2, X460-G2  | 2,048                        |
| IPv6 route sharing in hardware—route mask lengths for which ECMP is supported in hardware.  | ExtremeSwitching X460-G2, X450-G2, X620, 5420, 5520                      | 0–64<br>>64 single path only |
|   | ExtremeSwitching X670-G2, X690, X870, X590, X465, X695                   | 0–128 <sup>r</sup>           |
|   | ExtremeSwitching X440-G2   | Not supported                |
| IP router interfaces—maximum number of VLANs performing IPv4 and/or IPv6 routing. Excludes sub-VLANs.                             | ExtremeSwitching X460-G2, X670-G2, X450-G2, X870, X690, X590, X465, X695 | 2,048                        |
|   | ExtremeSwitching X620, X440-G2   | 510                          |
|   | ExtremeSwitching 5420  | 1,533                        |
|   | ExtremeSwitching 5520  | 2,048                        |

**Table 8: Supported Limits for Edge and Base License (continued)**

| Metric  | Product  | Limit                  |
|---|--|------------------------|
| IP multicast static routes—maximum number of permanent multicast IP routes.   | ExtremeSwitching X460-G2, X670-G2, X450-G2, X870, X690, X590, X465, X695, 5420, 5520 | 1,024                  |
| IP unicast static routes—maximum number of permanent IP unicast routes.   | ExtremeSwitching X460-G2, X670-G2, X450-G2, X870, X690, X590, X465, X695, 5420, 5520 | 1,024                  |
|   | ExtremeSwitching X620, X440-G2   | 480                    |
| IP route sharing (maximum gateways)—Configurable maximum number of gateways used by equal cost multipath OSPF, BGP, IS-IS, static routes, or L2VPNs. Static routes, OSPF, and BGP are limited to 64 ECMP gateways per destination, while IS-IS is limited to 8. L2VPNs are limited to 16 LSPs per pseudowire on platforms that support 32 gateways, and 64 LSPs per pseudowire on platforms that support 64 gateways. | ExtremeSwitching X460-G2, X670-G2, X450-G2, X620, X870, X690, X590, X465, X695       | 2, 4, 8, 16, 32, or 64 |
|   | ExtremeSwitching 5420, 5520  | 2, 4, or 8             |
|   | ExtremeSwitching X440-G2   | N/A                    |

**Table 8: Supported Limits for Edge and Base License (continued)**

| Metric  | Product                             | Limit |
|---|-------------------------------------|-------|
| IP route sharing (total combinations of gateway sets)<br>—maximum number of combinations of sets of adjacent gateways used by multipath OSPF, BGP, IS-IS, or static routes.   | ExtremeSwitching X670-G2            |       |
|   | 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   |
|   | ExtremeSwitching 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, X465, X695   |                                     |       |
| 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                                 |       |
| <b>Note:</b> 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 <a href="#">ExtremeXOS 31.5 User Guide</a> . |                                     |       |
| ExtremeSwitching X870   |                                     |       |
| if maximum gateways is 2  | 2,046                               |       |
| if maximum gateways is 4  | 2,046                               |       |
| if maximum gateways is 8  | 2,046                               |       |

**Table 8: Supported Limits for Edge and Base License (continued)**

| Metric  | Product  | Limit   |
|---|--|---|
|   | if maximum gateways is 16 (default)<br>if maximum gateways is 32<br>if maximum gateways is 64  | 1,022<br>510<br>254   |
|   | ExtremeSwitching X440-G2   | N/A   |
|   | ExtremeSwitching 5420<br><b>Note:</b> 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 <a href="#">ExtremeXOS 31.5 User Guide</a> . | 510 (if maximum gateways is 2)<br>254 (if maximum gateway is 4)<br>126 (if maximum gateways is 8)   |
|   | ExtremeSwitching 5520<br><b>Note:</b> 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 <a href="#">ExtremeXOS 31.5 User Guide</a> . | 2046 (if maximum gateways is 2)<br>1022 (if maximum gateway is 4)<br>510 (if maximum gateways is 8) |
| <b>IP multinetting (secondary IP addresses)</b> —maximum number of secondary IP addresses per VLAN.                                   | ExtremeSwitching X450-G2, X460-G2, X670-G2, X620, X440-G2, X870, X690, X590, X465, X695, 5420, 5520  | 255   |
| <b>Jumbo frames</b> —maximum size supported for jumbo frames, including the CRC.  | ExtremeSwitching X450-G2, X460-G2, X670-G2, X620, X440-G2, X870, X690, X590, X465, X695, 5420, 5520  | 9,216   |
| <b>L2 VPN: VCCV (pseudowire Virtual Circuit Connectivity Verification) VPNs per switch</b> —maximum number of VCCV enabled VPLS VPNs. | ExtremeSwitching X460-G2, X670-G2, X870, X690, X590, X465<br>ExtremeSwitching X450-G2, X620, X440-G2, X695, 5420, 5520   | 16<br>N/A   |
| <b>L2 VPN: VPLS MAC addresses</b> —maximum number of MAC addresses learned by a switch.   | ExtremeSwitching X670-G2, X690, X590, X465<br>ExtremeSwitching X460-G2<br>ExtremeSwitching X870<br>ExtremeSwitching X450-G2, X620, X440-G2, X695, 5420, 5520   | 140,000<br>55,000<br>65,000<br>N/A  |
| <b>L2 VPN: VPLS VPNs</b> —maximum number of VPLS virtual private networks per switch.   | ExtremeSwitching X460-G2, X670-G2, X870, X690, X590, X465<br>ExtremeSwitching X450-G2, X620, X440-G2, X695, 5420, 5520   | 1,023<br>N/A  |

**Table 8: Supported Limits for Edge and Base License (continued)**

| Metric  | Product   | Limit  |
|---|---|--------|
| <b>L2 VPN: VPLS peers</b> —<br>maximum number of VPLS<br>peers per VPLS instance.   | ExtremeSwitching X670-G2, X460-G2,<br>X870, X690, X590, X465  | 64     |
|   | ExtremeSwitching X450-G2, X620, X440-<br>G2, X695, 5420, 5520 | N/A    |
| <b>L2 VPN: LDP pseudowires</b> —<br>maximum number of<br>pseudowires per switch.  | ExtremeSwitching X670-G2, X460-G2,<br>X870, X690, X590, X465  | 7,000  |
|   | ExtremeSwitching X450-G2, X620, X440-<br>G2, X695, 5420, 5520 | N/A    |
| <b>L2 VPN: static pseudowires</b> —<br>maximum number of static<br>pseudowires per switch.  | ExtremeSwitching X670-G2, X460-G2,<br>X870, X690, X590, X465  | 7,000  |
|   | ExtremeSwitching X450-G2, X620, X440-<br>G2, X695, 5420, 5520 | N/A    |
| <b>L2 VPN: Virtual Private Wire<br/>Service (VPWS) VPNs</b> —<br>maximum number of virtual<br>private networks per switch.  | ExtremeSwitching X670-G2, X870, X690,<br>X590, X465           | 4,090  |
|   | ExtremeSwitching X460-G2                                      | 1,023  |
|   | ExtremeSwitching X450-G2, X620, X440-<br>G2, X695, 5420, 5520 | N/A    |
| <b>Layer-2 IPMC forwarding<br/>caches</b> —(IGMP/MLD/PIM<br>snooping) in mac-vlan mode.<br><br><b>Note:</b><br><ul style="list-style-type: none"> <li>The internal lookup table configuration used is "I2-and-I3".</li> <li>IPv6 and IPv4 L2 IPMC scaling is the same for this mode.</li> <li>Layer-2 IPMC forwarding cache limits—(IGMP/MLD/PIM snooping) in mixed-mode are the same.</li> </ul> | ExtremeSwitching X670-G2, X695                                | 73,000 |
|   | ExtremeSwitching X460-G2                                      | 24,000 |
|   | ExtremeSwitching X450-G2                                      | 14,000 |
|   | ExtremeSwitching X620, X440-G2                                | 5,000  |
|   | ExtremeSwitching X870   | 36,000 |
|   | ExtremeSwitching X690, X590, X465                             | 67,000 |
|   | ExtremeSwitching 5420   | 64,000 |
|   | ExtremeSwitching 5520   | 32,768 |

**Table 8: Supported Limits for Edge and Base License (continued)**

| Metric   | Product  | Limit           |
|--|--|-----------------|
| <b>Layer-3 IPv4 Multicast</b> —maximum number of <S,G,V> entries installed in the hardware (IP multicast compression enabled).<br><br><b>Note:</b> <ul style="list-style-type: none"> <li>Limit value is the same for MVR senders, PIM Snooping entries, PIM SSM cache, IGMP senders, PIM cache.</li> <li>Assumes source-group-vlan mode as look up key.</li> <li>Layer 3 IPMC cache limit in mixed mode also has the same value.</li> </ul> | ExtremeSwitching X460-G2   | 26,000          |
|  | ExtremeSwitching X450-G2   | 21,000          |
|  | ExtremeSwitching X670-G2   | 77,500          |
|  | ExtremeSwitching X620, X440-G2   | 1,500           |
|  | ExtremeSwitching X870  | 52,000          |
|  | ExtremeSwitching X690, X590, X465  | 93,000          |
|  | ExtremeSwitching X695  | 104,000         |
|  | ExtremeSwitching 5420M<br>ExtremeSwitching 5420F   | 12,000<br>6,000 |
| <b>Layer-3 IPv6 Multicast</b> —maximum number of <S,G,V> entries installed in the hardware (IP multicast compression enabled).<br><br><b>Note:</b> <ul style="list-style-type: none"> <li>Limit value is the same for MLD sender per switch, PIM IPv6 cache.</li> <li>Assumes source-group-vlan mode as lookup key.</li> </ul>   | ExtremeSwitching X670-G2   | 30,000          |
|  | ExtremeSwitching X460-G2   | 14,000          |
|  | ExtremeSwitching X450-G2   | 10,000          |
|  | ExtremeSwitching X620, X440-G2   | 700             |
|  | ExtremeSwitching X870  | 18,000          |
|  | ExtremeSwitching X690, X590, X465  | 48,000          |
|  | ExtremeSwitching X695  | 52,000          |
|  | ExtremeSwitching 5420M<br>ExtremeSwitching 5420F   | 6,000<br>3,000  |
| <b>Load sharing</b> —maximum number of load sharing groups.<br><br><b>Note:</b> 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.   | ExtremeSwitching X450-G2, X460-G2, X670-G2, X620, X440-G2, X870, X690, X590, X465, X695, 5420, 5520        | 128             |
| <b>Load sharing</b> —maximum number of ports per load-sharing group.   | For standalone and stacked:<br>ExtremeSwitching X620, X440-G2, 5420  | 8               |
|  | For standalone: ExtremeSwitching X670-G2, X460-G2, X450-G2, X870, X690, X590, X465, X695, 5520             | 32              |
|  | For stacked: ExtremeSwitching X670-G2, X460-G2, X450-G2, X670-G2, X870, X690, X590, X465, X695, 5420, 5520 | 64              |

**Table 8: Supported Limits for Edge and Base License (continued)**

| Metric  | Product   | Limit  |
|---|---|--|
| <b>Logged messages</b> —maximum number of messages logged locally on the system.  | ExtremeSwitching X450-G2, X460-G2, X670-G2, X620, X440-G2, X870, X690, X590, X465, X695, 5420, 5520   | 20,000   |
| <b>MAC-based security</b> —maximum number of MAC-based security policies.   | ExtremeSwitching X450-G2, X460-G2, X670-G2, X620, X440-G2, X870, X690, X590, X465, X695, 5420, 5520   | 1,024  |
| <b>MAC Locking</b> —Maximum number of MAC locking stations that can be learned on a port.   | ExtremeSwitching X450-G2, X460-G2, X670-G2, X620, X440-G2, X870, X690, X590, X465, X695, 5420, 5520   | 64 (static MAC locking stations)<br>600 (first arrival MAC locking stations) |
| <b>Meters</b> —maximum number of meters supported.  | ExtremeSwitching X460-G2, X450-G2, X670-G2, X440-G2, X620, X870, X690, X590, X465, X695, 5420, 5520   | 2,048  |
| <b>Maximum mirroring instances.</b>   | ExtremeSwitching X450-G2, X460-G2, X670-G2, X870, X690, X590, X465, X695<br><br><b>Note:</b> 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. You can use a total of four slots, while there are no more than two egress instances. The maximum possible combination for mirroring instances:<br><br><ol style="list-style-type: none"> <li>4 ingress</li> <li>3 ingress + 1 egress</li> <li>2 ingress + 2 egress</li> <li>2 (ingress + egress)</li> <li>1 (ingress + egress) + 2 ingress</li> <li>1 (ingress + egress) + 1 egress + 1 ingress</li> </ol> | 16 (including default mirroring instance)                                    |
|   | ExtremeSwitching X620, X440-G2<br><br><b>Note:</b> For stacks containing X620 or X440-G2, maximum supported egress mirror instances is 1.   | 1 (egress)   |
|   | ExtremeSwitching 5420, 5520   | 4 total, 2 egress  |
| <b>Mirroring (filters)</b> —maximum number of mirroring filters.<br><br><b>Note:</b> This is the number of filters across all the active mirroring instances. | ExtremeSwitching X450-G2, X460-G2, X670-G2, X620, X440-G2, X870, X690, X590, X465, X695, 5420, 5520   | 128  |



**Table 8: Supported Limits for Edge and Base License (continued)**

| Metric  | Product   | Limit |
|---|---|-------|
| <b>Mirroring, one-to-many (filters)</b><br>—maximum number of one-to-many mirroring filters.<br><br><b>Note:</b> This is the number of filters across all the active mirroring instances. | ExtremeSwitching X450-G2, X460-G2, X670-G2, X620, X440-G2, X870, X690, X590, X465, X695, 5420, 5520 | 128   |
| <b>Mirroring, one-to-many (monitor port)</b> —maximum number of one-to-many monitor ports.  | ExtremeSwitching X450-G2, X460-G2, X670-G2, X620, X440-G2, X870, X690, X590, X465, X695, 5420, 5520 | 16    |
| <b>MLAG ports</b> —maximum number of MLAG ports allowed.  | ExtremeSwitching X670-G2, X690, X695  | 71    |
|   | ExtremeSwitching X440-G2, X450-G2   | 51    |
|   | ExtremeSwitching X460-G2  | 53    |
|   | ExtremeSwitching X620   | 15    |
|   | ExtremeSwitching X870   | 127   |
|   | ExtremeSwitching X590,  | 35    |
|   | ExtremeSwitching X465   | 55    |
| ExtremeSwitching 5420, 5520   | 59  |       |
| <b>MLAG peers</b> —maximum number of MLAG peers allowed.  | ExtremeSwitching X450-G2, X460-G2, X670-G2, X620, X440-G2, X870, X690, X590, X465, X695, 5420, 5520 | 2     |
| <b>MPLS RSVP-TE interfaces</b> —maximum number of interfaces.   | ExtremeSwitching X460-G2, X670-G2, X590, X465,, X695, X870  | 32    |
|   | ExtremeSwitching X450-G2, X440-G2, X620, 5420, 5520   | N/A   |
| <b>MPLS RSVP-TE ingress LSPs</b> —maximum number of ingress LSPs.   | ExtremeSwitching X460-G2, X670-G2, X870, X590,X690, X695, X465                                      | 2,000 |
|   | ExtremeSwitching X450-G2, X440-G2, X620, 5420, 5520   | N/A   |
| <b>MPLS RSVP-TE egress LSPs</b> —maximum number of egress LSPs.   | ExtremeSwitching X460-G2, X670-G2, X870, X690 X590, X465, X695                                      | 2,000 |
|   | ExtremeSwitching X450-G2, X440-G2, X620, 5420, 5520   | N/A   |
| <b>MPLS RSVP-TE transit LSPs</b> —maximum number of transit LSPs.   | ExtremeSwitching X460-G2, X670-G2   | 2,000 |
|   | ExtremeSwitching X870, X690, X590, X465, X695   | 4,000 |
|   | ExtremeSwitching X450-G2, X440-G2, X620, 5420, 5520   | N/A   |

**Table 8: Supported Limits for Edge and Base License (continued)**

| Metric   | Product  | Limit |
|--|--|-------|
| MPLS RSVP-TE paths—<br>maximum number of paths.  | ExtremeSwitching X460-G2   | 1,000 |
|  | ExtremeSwitching X670-G2, X870, X690,<br>X590, X465, X695                      | 2,000 |
|  | ExtremeSwitching X450-G2, X440-G2,<br>X620, 5420, 5520                         | N/A   |
| MPLS RSVP-TE profiles—<br>maximum number of profiles.  | ExtremeSwitching X460-G2   | 1,000 |
|  | ExtremeSwitching X670-G2, X870, X690<br>X590, X465, X695                       | 2,000 |
|  | ExtremeSwitching X450-G2, X440-G2,<br>X620, 5420, 5520                         | N/A   |
| MPLS RSVP-TE EROs—<br>maximum number of EROs per<br>path.  | ExtremeSwitching X460-G2, X670-G2,<br>X870, X690 X590, X465, X695              | 64    |
|  | ExtremeSwitching X450-G2, and<br>ExtremeSwitching X440-G2, X620, 5420,<br>5520 | N/A   |
| MPLS LDP peers—maximum<br>number of MPLS LDP peers per<br>switch.                                  | ExtremeSwitching X670-G2, X460-G2,<br>X870, X690 X590, X465, X695              | 128   |
|  | ExtremeSwitching X450-G2, X440-G2,<br>X620, 5420, 5520                         | N/A   |
| MPLS LDP adjacencies—<br>maximum number of MPLS<br>LDP adjacencies per switch.                     | ExtremeSwitching X460-G2   | 50    |
|  | ExtremeSwitching X670-G2, X870, X690<br>X590, X465, X695                       | 64    |
|  | ExtremeSwitching X450-G2, X440-G2,<br>X620, 5420, 5520                         | N/A   |
| MPLS LDP ingress LSPs—<br>maximum number of MPLS<br>LSPs that can originate from a<br>switch.      | ExtremeSwitching X670-G2, X460-G2,<br>X870, X690 X590, X465, X695              | 2,048 |
|  | ExtremeSwitching X450-G2, X440-G2,<br>X620, 5420, 5520                         | N/A   |
| MPLS LDP-enabled interfaces—<br>maximum number of MPLS<br>LDP configured interfaces per<br>switch. | ExtremeSwitching X670-G2, X460-G2,<br>X870, X690 X590, X465, X695              | 128   |
|  | ExtremeSwitching X450-G2, X440-G2,<br>X620, 5420, 5520                         | N/A   |
| MPLS LDP transit LSPs—<br>maximum number of MPLS<br>transit LSPs per switch.                       | ExtremeSwitching X670-G2, X460-G2,<br>X870, X690 X590, X465, X695              | 4,000 |
|  | ExtremeSwitching X450-G2, X440-G2,<br>X620, 5420, 5520                         | N/A   |
| MPLS LDP egress LSPs—<br>maximum number of MPLS<br>egress LSPs that can terminate<br>on a switch.  | ExtremeSwitching X670-G2, X460-G2,<br>X870, X690 X590, X465, X695              | 4,000 |
|  | ExtremeSwitching X450-G2, X440-G2,<br>X620, 5420, 5520                         | N/A   |

**Table 8: Supported Limits for Edge and Base License (continued)**

| Metric  | Product   | Limit  |
|---|---|--------|
| MPLS static egress LSPs—<br>maximum number of static egress LSPs.   | ExtremeSwitching X460-G2  | 7,116  |
|   | ExtremeSwitching X870, X690, X590,<br>X465, X695, X670-G2         | 8,000  |
|   | ExtremeSwitching X450-G2, X440-G2,<br>X620, 5420, 5520            | N/A    |
| MPLS static ingress LSPs—<br>maximum number of static ingress LSPs.   | ExtremeSwitching X460-G2, X870, X690<br>X590, X465, X695          | 4,000  |
|   | ExtremeSwitching X670-G2  | 2,048  |
|   | ExtremeSwitching X450-G2, X440-G2,<br>X620, 5420, 5520            | N/A    |
| MPLS static transit LSPs—<br>maximum number of static transit LSPs  | ExtremeSwitching X670-G2, X460-G2,<br>X870, X690 X590, X465, X695 | 4,000  |
|   | ExtremeSwitching X450-G2, X440-G2,<br>X620, 5420, 5520            | N/A    |
| Multicast listener discovery<br>(MLD) snooping per-VLAN<br>filters—maximum number of<br>VLANs supported in per-VLAN<br>MLD snooping mode. | ExtremeSwitching X460-G2, X670-G2,<br>X870                        | 768    |
|   | ExtremeSwitching X450-G2  | 508    |
|   | ExtremeSwitching X620, X440-G2                                    | 256    |
|   | ExtremeSwitching X690, X590, X465,<br>X695                        | 1,500  |
|   | ExtremeSwitching 5420   | 1,500  |
|   | ExtremeSwitching 5520   | 1,000  |
| Multicast listener discovery<br>(MLD)v1 subscribers—<br>maximum number of MLDv1<br>subscribers per port. <sup>n</sup>                     | ExtremeSwitching X670-G2, X450-G2,<br>X460-G2                     | 4,000  |
|   | ExtremeSwitching X620, X440-G2                                    | 3,500  |
|   | ExtremeSwitching X870, X690, X590,<br>X465, X695, 5420, 5520      | 4,000  |
| Multicast listener discovery<br>(MLD)v1 subscribers—<br>maximum number of MLDv1<br>subscribers per switch. <sup>n</sup>                   | ExtremeSwitching X460-G2, X450-G2,<br>X620, X440-G2, 5420, 5520   | 10,000 |
|   | ExtremeSwitching X670-G2  | 30,000 |
|   | ExtremeSwitching X870, X690, X590,<br>X465, X695                  | 45,000 |
| Multicast listener discovery<br>(MLD)v2 subscribers—<br>maximum number of MLDv2<br>subscribers per port. <sup>n</sup>                     | ExtremeSwitching X670-G2, X460-G2,<br>X450-G2, 5420, 5520         | 4,000  |
|   | ExtremeSwitching X620, X440-G2                                    | 3,500  |
|   | ExtremeSwitching X870, X690, X590,<br>X465, X695                  | 4,000  |

**Table 8: Supported Limits for Edge and Base License (continued)**

| Metric   | Product   | Limit  |
|--|---|--------|
| <b>Multicast listener discovery (MLD)v2 subscribers</b> —maximum number of MLDv2 subscribers per switch. <sup>1</sup>      | ExtremeSwitching X670-G2  | 30,000 |
|  | ExtremeSwitching X460-G2, X450-G2, X620, X440-G2, 5420, 5520  | 10,000 |
|  | ExtremeSwitching X870, X690, X590, X465, X695   | 45,000 |
| <b>Multicast listener discovery (MLD)v2 maximum source per group</b> —maximum number of source addresses per group.        | ExtremeSwitching X450-G2, X460-G2, X670-G2, X620, X440-G2, X870, X690, X590, X465, X695, 5420, 5520 | 200    |
| <b>Multicast listener discovery (MLD) SSM-map entries</b> —maximum number of MLD SSM mapping entries.                      | ExtremeSwitching X450-G2, X460-G2, X670-G2, X870, X690, X590, X465, X695, 5420, 5520                | 500    |
|  | ExtremeSwitching X440-G2, X620  | 50     |
| <b>Multicast listener discovery (MLD) SSM-MAP entries</b> —maximum number of sources per group in MLD SSM mapping entries. | ExtremeSwitching X450-G2, X460-G2, X670-G2, X620, X440-G2, X870, X690, X590, X465, X695, 5420, 5520 | 50     |
| <b>Network Login</b> —maximum number of clients being authenticated on MAC-based VLAN enabled ports.                       | ExtremeSwitching X450-G2, X460-G2, X670-G2, X620, X440-G2, X870, X690, X590, X465, X695, 5420, 5520 | 1,024  |
| <b>Network Login</b> —maximum number of clients being authenticated with policy mode enabled with TCI overwrite enabled.   | ExtremeSwitching X450-G2, X460-G2, X590, X465, 5420, 5520   | 1,024  |
|  | ExtremeSwitching X670-G2, X870, X690, X695  | 512    |
|  | ExtremeSwitching X620, X440-G2  | 256    |
| <b>Network Login</b> —maximum number of dynamic VLANs.   | ExtremeSwitching X460-G2, X450-G2, X670-G2, X870, X690, X590, X465, X695                            | 2,000  |
|  | ExtremeSwitching X440-G2, X620, 5420, 5520  | 1,024  |
| <b>Network Login VLAN VSAs</b> —maximum number of VLANs a client can be authenticated on at any given time.                | ExtremeSwitching X450-G2, X460-G2, X670-G2, X620, X440-G2, X870, X690, X590, X465, X695, 5420, 5520 | 10     |
| <b>Network Service Identifiers (NSI)/VLAN mappings</b> —maximum number of VLANs to NSI mappings.                           | ExtremeSwitching X450-G2, X460-G2, X670-G2, X620, X440-G2, X870, X690, X590, X465, X695, 5420, 5520 | 94     |
| <b>Network Address Translation (NAT) VLANs</b> —maximum number of NAT VLANs.   | ExtremeSwitching X465, X590, X690, X695, X870   | 4      |

**Table 8: Supported Limits for Edge and Base License (continued)**

| Metric   | Product   | Limit   |
|--|---|---|
| <b>Network Address Translation (NAT) Sessions</b> —number of NAT sessions supported (non twice-NAT).                               | ExtremeSwitching X465, X590, X690, X870   | 1,024   |
|  | ExtremeSwitchingX695  | 1,023   |
| <b>Node Alias</b> —maximum number of entries per slot.   | ExtremeSwitching X450-G2, X460-G2, X670-G2 X620, X440-G2, X870, X690, X590, X465, X695, 5420, 5520  | 8,192   |
| <b>ONEPolicy Dynamic ACL Rules</b> —maximum number of Dynamic ACLs supported via RADIUS VSA 232 per user in Access-List mode.      | ExtremeSwitching X450-G2, X460-G2   | 64<br>(Demonstration Feature only)  |
|  | ExtremeSwitching X450-G2, X460-G2, X620, X440-G2, X870, X690, X590, X465, X695, 5420, 5520          | 16  |
| <b>ONEPolicy Roles/Profiles</b> —maximum number of policy roles/profiles.  | ExtremeSwitching X450-G2, X460-G2, X670-G2, X620, X440-G2, X870, X690, X590, X465, X695, 5420, 5520 | 63  |
| <b>ONEPolicy Rules per Role/Profile</b> —maximum number of rules per role/policy.  | ExtremeSwitching X450-G2, X460-G2   | IPv6 rules: 256<br>IPv4 rules: 256<br>L2 Rules: 184<br>MAC Rules: 256               |
|  | ExtremeSwitching X670-G2, X870  | IPv6 Rules: 256<br>L2 Rules: 184<br>MAC Rules: 256<br>IPv4 Rules: 256               |
|  | ExtremeSwitching X620, X440-G2  | IPv6 and Mac Rules: 0<br>Ipv4 Rules: 256 (per switch)<br>L2 Rules: 184 (per switch) |
|  | ExtremeSwitching X465, X690, X590, X695   | IPv4 Rules: 512<br>IPv6 Rules: 512<br>MAC Rules: 512<br>L2 Rules: 440               |
|  | ExtremeSwitching 5420, 5520   | 4,024   |
| <b>ONEPolicy Authenticated Users per Switch</b> —maximum number of authenticated users per switch only with TCI-Overwrite enabled. | ExtremeSwitching X450-G2, X460-G2, X590, X465, 5420, 5520   | 1,024   |
|  | ExtremeSwitching X670-G2, X690, X870, X695  | 512   |
|  | ExtremeSwitching X620, X440-G2  | 256   |
|  | Stacking  | Depends on the stack nodes, but the maximum is 65,535.                              |

**Table 8: Supported Limits for Edge and Base License (continued)**

| Metric  | Product   | Limit                 |
|---|---|-----------------------|
| <b>ONEPolicy Authenticated Users per Switch</b> —maximum number of authenticated users per switch with TCI-Overwrite disabled.<br><br><b>Note:</b> The maximum values assume 75% utilization of VLAN-XLATE hash table.                    | ExtremeSwitching X690, X590, X465                         | 24,576                |
|   | ExtremeSwitching X670-G2, X460-G2, X870, X695             | 12,288                |
|   | ExtremeSwitching X450-G2                                  | 6,144                 |
|   | ExtremeSwitching X620, X440-G2                            | 1,536                 |
|   | Stacking<br>ExtremeSwitching 5420, 5520                   | 1,536–65,534<br>9,216 |
| <b>ONEPolicy Authenticated Users per Port per Switch</b> — maximum number of authenticated users per port per switch with TCI overwrite disabled.<br><br><b>Note:</b> The maximum values assume 75% utilization of VLAN-XLATE hash table. | ExtremeSwitching X450-G2                                  | 6,144                 |
|   | ExtremeSwitching X460-G2, X670-G2, X870, X695             | 12,288                |
|   | ExtremeSwitching X690, X590, X465                         | 24,576                |
|   | ExtremeSwitching X440-G2, X620                            | 1,536                 |
|   | ExtremeSwitching 5420, 5520                               | 9,216                 |
| <b>ONEPolicy Authenticated Users per Port per Switch</b> — maximum number of authenticated users per port with only with TCI-Overwrite enabled.   | ExtremeSwitching X450-G2, X460-G2, X590, X465, 5420, 5520 | 1,024                 |
|   | ExtremeSwitching X670-G2, X870, X690, X695                | 512                   |
|   | ExtremeSwitching X620, X440-G2                            | 256                   |
| <b>ONEPolicy Permit/Deny Traffic Classification Rules Types</b> — total maximum number of unique permit/deny traffic classification rules types (system/stack).   | ExtremeSwitching X450-G2, X460-G2, X670-G2, X870          | 952                   |
|   | ExtremeSwitching X620, X440-G2                            | 440                   |
|   | ExtremeSwitching X690, X590, X465, X695                   | 1,976                 |
|   | ExtremeSwitching 5420, 5520                               | 4,024                 |
| <b>ONEPolicy Permit/Deny Traffic Classification Rules Types</b> — maximum number of unique MAC permit/deny traffic classification rules types (macsource/macdest).  | ExtremeSwitching X450-G2, X460-G2, X670-G2, X870          | 256                   |
|   | ExtremeSwitching X620, X440-G2                            | N/A                   |
|   | ExtremeSwitching X690, X590, X465, X695                   | 512                   |
|   | ExtremeSwitching 5420, 5520                               | 1,024                 |
| <b>ONEPolicy Permit/Deny Traffic Classification Rules Types</b> — maximum number of unique IPv6 permit/deny traffic classification rules types (ipv6dest).  | ExtremeSwitching X450-G2, X460-G2, X670-G2, X870          | 256                   |
|   | ExtremeSwitching X620, X440-G2                            | N/A                   |
|   | ExtremeSwitching X690, X590, X465, X695                   | 512                   |
|   | ExtremeSwitching 5420, 5520                               | 1,024                 |

**Table 8: Supported Limits for Edge and Base License (continued)**

| Metric  | Product   | Limit            |
|---|---|------------------|
| <b>ONEPolicy Permit/Deny Traffic Classification Rules Types</b> —maximum number of unique IPv4 permit/deny traffic classification rules (typesipsource / ipdest / ipfrag / udpsourceportIP / udpdestportIP / tcpsourceportIP / tcpdestportIP / ipttl / iptos / iptype). | ExtremeSwitching X450-G2, X460-G2, X670-G2, X620, X440-G2, X870                                     | 256              |
|   | ExtremeSwitching X690, X590, X465, X695   | 512              |
|   | ExtremeSwitching 5420, 5520   | 1,024            |
| <b>ONEPolicy Permit/Deny Traffic Classification Rules Types</b> —maximum number of unique Layer 2 permit/deny traffic classification rules (ethertype/port).  | ExtremeSwitching X450-G2, X460-G2, X670-G2, X870  | 184              |
|   | ExtremeSwitching X620, X440-G2  | 184              |
|   | ExtremeSwitching X690, X590, X465, X695   | 440              |
|   | ExtremeSwitching 5420, 5520   | 952              |
| <b>Policy-based routing (PBR) redundancy</b> —maximum number of flow-redirects.   | ExtremeSwitching X450-G2, X460-G2, X670-G2, X620, X440-G2, X870, X690, X590, X465, X695, 5420, 5520 | 256 <sup>o</sup> |
| <b>Policy-based routing (PBR) redundancy</b> —maximum number of next hops per each flow-direct.   | ExtremeSwitching X450-G2, X460-G2, X670-G2, X620, X440-G2, X870, X690, X590, X465, X695, 5420, 5520 | 32 <sup>o</sup>  |
| <b>Private VLANs</b> —maximum number of subscribers. Assumes a minimum of one port per network and subscriber VLAN.   | ExtremeSwitching X670-G2  | 63               |
|   | ExtremeSwitching X460-G2  | 53               |
|   | ExtremeSwitching X450-G2  | 51               |
|   | ExtremeSwitching X440-G2  | 47               |
|   | ExtremeSwitching X620   | 15               |
|   | ExtremeSwitching X870   | 127              |
|   | ExtremeSwitching X690, X695   | 71               |
|   | ExtremeSwitching X590, X465   | 31               |
| ExtremeSwitching 5420, 5520   | 36  |                  |

**Table 8: Supported Limits for Edge and Base License (continued)**

| Metric   | Product  | Limit  |
|--|--|--|
| <b>Private VLANs</b> —maximum number of private VLANs with an IP address on the network VLAN.<br><br><b>Note:</b> This limit is dependent on the maximum number of private VLANs in an L2-only environment if the configuration has tagged and translated ports. | ExtremeSwitching X670-G2, X460-G2, X870, X690, X590, X465, X695                            | 1,024  |
|  | ExtremeSwitching X450-G2   | 510  |
|  | ExtremeSwitching X440-G2   | 255  |
|  | ExtremeSwitching X620  | 510  |
|  | ExtremeSwitching 5420, 5520  | 960  |
| <b>Private VLANs</b> —maximum number of private VLANs in an L2-only environment.   | ExtremeSwitching X670-G2, X460-G2, X870, X690, X590, X465, X695                            | 1,280  |
|  | ExtremeSwitching X450-G2   | 597  |
|  | ExtremeSwitching X440-G2, X620   | 255  |
|  | ExtremeSwitching 5420, 5520  | 960  |
| <b>PTP/1588v2 Clock Ports</b>  | ExtremeSwitching X460-G2, X670-G2  | 31 for boundary clock<br>1 for ordinary clock  |
|  | ExtremeSwitching X440-G2, X465, X620, X870, X690, X590, X695, 5420, 5520                   | N/A  |
| <b>PTP/1588v2 Clock Instances</b>  | ExtremeSwitching X670-G2, X460-G2  | 2 combinations: <ul style="list-style-type: none"> <li>• Transparent clock + ordinary clock</li> <li>• Transparent clock + boundary clock</li> </ul> |
|  | ExtremeSwitching X440-G2, X465, X620, X870, X690, X590, X695, 5420, 5520                   | N/A  |
| <b>PTP/1588v2 Unicast Static Slaves</b>  | ExtremeSwitching X670-G2, X460-G2  | 40 entries per clock port  |
|  | ExtremeSwitching X440-G2, X465, X620, X870, X690, X590, X695, 5420, 5520                   | N/A  |
| <b>PTP/1588v2 Unicast Static Masters</b>   | ExtremeSwitching X670-G2, X460-G2  | 10 entries per clock type  |
|  | ExtremeSwitching X440-G2, X465, X620, X870, X690, X590, X695, 5420, 5520                   | N/A  |
| <b>Route policies</b> —suggested maximum number of lines in a route policy file.   | ExtremeSwitching X460-G2, X670-G2, X620, X440-G2, X870, X690, X590, X465, X695, 5420, 5520 | 10,000   |
| <b>RIP Learned Routes</b> —maximum number of RIP routes supported without aggregation.   | ExtremeSwitching X670-G2, X460-G2, X440-G2, X620, X870, X690, X590, X465, X695, 5420, 5520 | 10,000   |



**Table 8: Supported Limits for Edge and Base License (continued)**

| Metric   | Product   | Limit |
|--|---|-------|
| <b>RIP interfaces on a single router</b><br>—recommended maximum number of RIP routed interfaces on a switch.  | ExtremeSwitching X670-G2, X460-G2, X450-G2, X870, X690, X590 , X465, X695, 5420, 5520       | 256   |
|  | ExtremeSwitching X440-G2, X620  | 128   |
| <b>RIPng learned routes</b> —maximum number of RIPng routes.   | ExtremeSwitching X670-G2, X460-G2, X450-G2, X870, X690, X590 , X465, X695, 5420, 5520       | 3,000 |
|  | ExtremeSwitching X440-G2, X620  | N/A   |
| <b>Spanning Tree (maximum STPDs)</b> —maximum number of Spanning Tree Domains on port mode EMISTP.   | ExtremeSwitching X450-G2, X670-G2, X460-G2, X620, X870, X690, X590 , X465, X695, 5420, 5520 | 64    |
|  | ExtremeSwitching X440-G2  | 32    |
| <b>Spanning Tree PVST+</b> —maximum number of port mode PVST domains.<br><br><b>Note:</b> 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, ExtremeSwitching 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). | ExtremeSwitching X670-G2, X620  | 256   |
|  | ExtremeSwitching X460-G2, X450-G2, X440-G2, 5420, 5520                                      | 128   |
|  | ExtremeSwitching X870, X690, X590 , X465, X695  | 384   |
| <b>Spanning Tree</b> —maximum number of multiple spanning tree instances (MSTI) domains.   | ExtremeSwitching X450-G2, X460-G2, X670-G2, X620, X870, X690, X590 , X465, X695, 5420, 5520 | 64    |
|  | ExtremeSwitching X440-G2  | 32    |
| <b>Spanning Tree</b> —maximum number of VLANs per MSTI.<br><br><b>Note:</b> Maximum number of 10 active ports per VLAN when all 500 VLANs are in one MSTI.   | ExtremeSwitching X670-G2  | 500   |
|  | ExtremeSwitching X460-G2, X450-G2, X620, X870, X690, X590 , X465, X695, 5420, 5520          | 600   |
|  | ExtremeSwitching X440-G2  | 256   |
| <b>Spanning Tree</b> —maximum number of VLANs on all MSTP instances.   | ExtremeSwitching X670-G2, X460-G2, X450-G2, X620, X870, X690, X590 , X465, X695, 5420, 5520 | 1,024 |
|  | ExtremeSwitching X440-G2  | 512   |

**Table 8: Supported Limits for Edge and Base License (continued)**

| Metric  | Product   | Limit                |
|---|---|----------------------|
| <b>Spanning Tree (802.1d domains)</b> —maximum number of 802.1d domains per port.   | ExtremeSwitching X450-G2, X460-G2, X670-G2, X620, X440-G2, X870, X690, X590, X465, X695, 5420, 5520 | 1                    |
| <b>Spanning Tree (number of ports)</b> —maximum number of ports including all Spanning Tree domains.  | ExtremeSwitching X450-G2, X460-G2, X670-G2, X620, X870, X690, X590, X465, X695, 5420, 5520          | 4,096                |
|   | ExtremeSwitching X440-G2  | 2,048                |
| <b>Spanning Tree (maximum VLANs)</b> —maximum number of STP-protected VLANs (dot1d and dot1w).  | ExtremeSwitching X670-G2, X460-G2, X450-G2, X620, X870, X690, X590, X465, X695, 5420, 5520          | 1,024                |
|   | ExtremeSwitching X440-G2  | 600                  |
| <b>SSH (number of sessions)</b> —maximum number of simultaneous SSH sessions.   | ExtremeSwitching X450-G2, X460-G2, X670-G2, X620, X440-G2, X870, X690, X590, X465, X695, 5420, 5520 | 8                    |
| <b>Static MAC multicast FDB entries</b> —maximum number of permanent multicast MAC entries configured into the FDB.   | ExtremeSwitching X450-G2, X460-G2, X670-G2, X620, X440-G2, X870, X690, X590, X465, X695, 5420, 5520 | 1,024                |
| <b>Syslog servers</b> —maximum number of simultaneous Syslog servers that are supported.  | ExtremeSwitching X450-G2, X460-G2, X670-G2, X620, X440-G2, X870, X690, X590, X465, X695, 5420, 5520 | 16                   |
| <b>Syslog targets</b> —maximum number of configurable Syslog targets.   | ExtremeSwitching X450-G2, X460-G2, X670-G2, X620, X440-G2, X870, X690, X590, X465, X695, 5420, 5520 | 16                   |
| <b>Telnet (number of sessions)</b> —maximum number of simultaneous Telnet sessions.   | ExtremeSwitching X450-G2, X460-G2, X670-G2, X620, X440-G2, X870, X690, X590, X465, X695, 5420, 5520 | 8                    |
| <b>Virtual routers</b> —maximum number of user-created virtual routers that can be created on a switch.   | ExtremeSwitching X460-G2, X670-G2, X450-G2, X870, X690, X590, X465, X695, 5420, 5520                | 63                   |
|   | ExtremeSwitching X440-G2, X620  | 16 (local-only VRs)  |
| <b>Virtual router forwarding (VRFs)</b> —maximum number of VRFs that can be created on a switch.<br><br><b>Note:</b> * Subject to other system limitations. | ExtremeSwitching X460-G2, X670-G2, X450-G2, X870, X690, X590, X465, X695, 5420, 5520                | 960 *                |
|   | ExtremeSwitching X440-G2, X620  | 16 (local-only VRFs) |
| <b>Virtual router protocols per VR</b> —maximum number of routing protocols per VR.   | ExtremeSwitching X460-G2, X670-G2, X450-G2, X870, X690, X590, X465, X695, 5420, 5520                | 8                    |
|   | ExtremeSwitching X440-G2, X620  | N/A                  |

**Table 8: Supported Limits for Edge and Base License (continued)**

| Metric  | Product   | Limit   |
|---|---|---------|
| <b>Virtual router protocols per switch</b> —maximum number of VR protocols per switch.  | ExtremeSwitching X460-G2, X670-G2, X450-G2, X870, X690, X590, X465, X695, 5420, 5520                | 64      |
|   | ExtremeSwitching X440-G2, X620  | N/A     |
| <b>VLAN aggregation</b> —maximum number of port-VLAN combinations on any one superVLAN and all of its subVLANs.   | ExtremeSwitching X450-G2, X460-G2, X670-G2, X620, X440-G2, X870, X690, X590, X465, X695, 5420, 5520 | 1,000   |
| <b>VLANs</b> —includes all VLANs.<br><b>Note:</b> 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.) | ExtremeSwitching X450-G2, X460-G2, X670-G2, X620, X440-G2, X870, X690, X590, X465, X695, 5420, 5520 | 4,094   |
| <b>VLANs (Layer 2)</b> —maximum number of Layer 2 VLANs.  | ExtremeSwitching X450-G2, X460-G2, X670-G2, X620, X440-G2, X870, X690, X590, X465, X695, 5420, 5520 | 4,094   |
| <b>VLANs (Layer 3)</b> —maximum number of VLANs performing IPv4 and/or IPv6 routing. Excludes sub-VLANs.  | ExtremeSwitching X460-G2, X670-G2, X450-G2, X870, X690, X590, X465, X695, 5420, 5520                | 2,048   |
|   | ExtremeSwitching X440-G2, X620  | 510     |
| <b>VLAN Port Interfaces (VPIF)</b> —maximum number of VLAN port interfaces.   | ExtremeSwitching X440-G2, X450-G2, X460-G2, X620, 5420  | 65,536  |
|   | ExtremeSwitching X465, X590, X670-G2, X690, X870, X695, 5420, 5520                                  | 131,585 |
| <b>VLANs (maximum active port-based)</b> —maximum active ports per VLAN when 4,094 VLANs are configured with the default license.   | ExtremeSwitching X670-G2, X870, X690, X590, X465, X695, 5520  | 32      |
|   | ExtremeSwitching 5420   | 5       |
|   | ExtremeSwitching X440-G2  | 28      |
|   | ExtremeSwitching X460-G2  | 26      |
|   | ExtremeSwitching X620   | 16      |
|   | ExtremeSwitching X450-G2  | 29      |
|   | ExtremeSwitching X460-G2  | 24      |
| <b>VLANs (maximum active protocol-sensitive filters)</b> —number of simultaneously active protocol filters in the switch.   | ExtremeSwitching X450-G2, X460-G2, X670-G2, X620, X440-G2, X870, X690, X590, X465, X695, 5420, 5520 | 16      |

**Table 8: Supported Limits for Edge and Base License (continued)**

| Metric   | Product   | Limit             |
|--|---|-------------------|
| <b>VLAN translation</b> —maximum number of translation VLANs. Assumes a minimum of one port per translation and member VLAN.   | ExtremeSwitching X670-G2  | 63                |
|  | ExtremeSwitching X460-G2  | 53                |
|  | ExtremeSwitching X450-G2  | 51                |
|  | ExtremeSwitching X620   | 15                |
|  | ExtremeSwitching X440-G2  | 47                |
|  | ExtremeSwitching X870   | 127               |
|  | ExtremeSwitching X690, X695   | 71                |
|  | ExtremeSwitching X590, X465   | 31                |
|  | ExtremeSwitching 5420, 5520   | 36                |
| <b>VLAN translation</b> —maximum number of translation VLAN pairs with an IP address on the translation VLAN.<br><br><b>Note:</b> This limit is dependent on the maximum number of translation VLAN pairs in an L2-only environment if the configuration includes tagged and translated ports. | ExtremeSwitching X670-G2, X465, X870, X690, X590, X695  | 1,024             |
|  | ExtremeSwitching X450-G2  | 512               |
|  | ExtremeSwitching X620   | 510               |
|  | ExtremeSwitching X440-G2  | 255               |
|  | ExtremeSwitching 5420, 5520   | 960               |
| <b>VLAN translation</b> —maximum number of translation VLAN pairs in an L2-only environment.   | ExtremeSwitching X450-G2, X670-G2, X460-G2, X870, X690, X590, X465, X695                            | 2,046             |
|  | ExtremeSwitching X440-G2, X620  | 255               |
|  | ExtremeSwitching 5520   | 960               |
| <b>VMAN CEP</b> —maximum number of CVIDs.<br><br><b>Note:</b> With 75% hash table utilization.   | ExtremeSwitching X440-G2  | 1,500             |
|  | ExtremeSwitching X450-G2  | 6,000             |
|  | ExtremeSwitching X460-G2, X670-G2, X870   | 12,000            |
|  | ExtremeSwitching X590, X690, X465   | 24,000            |
|  | ExtremeSwitching 5420   | 768               |
|  | ExtremeSwitching 5520   | 9,000             |
| <b>XML requests</b> —maximum number of XML requests per second.<br><br><b>Note:</b> Limits are dependent on load and type of XML request. These values are dynamic ACL data requests.  | ExtremeSwitching X460-G2, X670-G2, X450-G2, X440-G2, X620, X870, X690, X590, X465, X695, 5420, 5520 | 10 with 100 DACLs |

**Table 8: Supported Limits for Edge and Base License (continued)**

| Metric   | Product   | Limit                       |
|--|---|-----------------------------|
| <b>XNV authentication</b> —maximum number of VMs that can be processed (combination of local and network VMs). | ExtremeSwitching X460-G2, X670-G2, X870, X690, X590, X465, X695, 5420, 5520                         | 2,048                       |
|  | ExtremeSwitching X450-G2, X440-G2, X620   | 1,024                       |
| <b>XNV database entries</b> —maximum number of VM database entries (combination of local and network VMs).     | ExtremeSwitching X450-G2, X460-G2, X670-G2, X620, X440-G2, X870, X690, X590, X465, X695, 5420, 5520 | 16,000                      |
| <b>XNV database entries</b> —maximum number of VPP database entries (combination of local and network VPPs).   | ExtremeSwitching X450-G2, X460-G2, X670-G2, X620, X440-G2, X870, X690, X590, X465, X695, 5420, 5520 | 2,048                       |
| <b>XNV dynamic VLAN</b> —Maximum number of dynamic VLANs created (from VPPs /local VMs).                       | ExtremeSwitching X450-G2, X460-G2, X670-G2, X620, X440-G2, X870, X690, X590, X465, X695, 5420, 5520 | 2,048                       |
| <b>XNV local VPPs</b> —maximum number of XNV local VPPs.   | ExtremeSwitching X450-G2, X460-G2, X670-G2, X620, X440-G2, X870, X690, X590, X465, X695, 5420, 5520 | 2,048 ingress<br>512 egress |
| <b>XNV policies/dynamic ACLs</b> —maximum number of policies/dynamic ACLs that can be configured per VPP.      | ExtremeSwitching X450-G2, X460-G2, X670-G2, X620, X440-G2, X870, X690, X590, X465, X695, 5420, 5520 | 8 ingress<br>4 egress       |
| <b>XNV network VPPs</b> —maximum number of XNV network VPPs. <sup>P</sup>                                      | ExtremeSwitching X450-G2, X460-G2, X670-G2, X620, X440-G2, X870, X690, X590, X465, X695, 5420, 5520 | 2,048 ingress<br>512 egress |

## Advanced Edge and Base License Limits

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

**Table 9: Supported Limits for Advanced Edge and Base License**

| Metric   | Product  | Limit  |
|--|--|--------|
| <b>BGP (peers)</b> —maximum number of BGP peers.                                     | 5420, 5520   | 2      |
| <b>BGP auto-peering</b> —maximum number of auto-peering nodes and VTEPs.             | ExtremeSwitching X670-G2, X690, X870, X590, X465, X695, 5420, 5520 | 64     |
| <b>BGP auto-peering attached IPv4 hosts</b> — maximum number of attached IPv4 hosts. | ExtremeSwitching X670-G2   | 16,000 |
|  | ExtremeSwitching X870, X690, X590, X465, X695, 5420, 5520          | 64,000 |
| <b>BGP auto-peering attached IPv6 hosts</b> — maximum number of attached IPv6 hosts. | ExtremeSwitching X670-G2   | 254    |
|  | ExtremeSwitching X870, X690, X590, X465, X695, 5420, 5520          | 8,000  |

**Table 9: Supported Limits for Advanced Edge and Base License (continued)**

| Metric  | Product   | Limit  |
|---|---|--------|
| <b>BGP auto-peering ECMP</b> —maximum number of equal cost multipath for auto-peering.<br><br><b>Note:</b> * Subject to the limitation imposed by the number of physical ports on a switch. | ExtremeSwitching X670-G2, ExtremeSwitching X690, X870, X590, X465, X695, 5420, 5520                 | 16*    |
|   | ExtremeSwitching 5420, 5520   | 4*     |
| <b>BGP auto-peering maximum IPv4 prefixes with ECMP</b> —Maximum number of IPv4 Network prefixes with ECMP.   | ExtremeSwitching X670-G2, ExtremeSwitching X690, X870, X590, X465, X695                             | 64,000 |
|   | ExtremeSwitching 5420, 5520   | 16,000 |
| <b>BGP auto-peering maximum IPv6 prefixes with ECMP</b> —Maximum number of IPv6 Network prefixes with ECMP.   | ExtremeSwitching X670-G2, X690, X870, X590, X465, X695  | 8,000  |
|   | ExtremeSwitching 5420, 5520   | 254    |
| <b>BGP auto-peering MLAG peers</b> —maximum MLAG peers per AutoBGP node.  | ExtremeSwitching X670-G2, X690, X870, X590, X465, X695, 5420, 5520                                  | 1      |
| <b>BGP auto-peering VRFs</b> —maximum number of VRFs.   | ExtremeSwitching X670-G2, X690, X870, X590, X465, X695, 5420, 5520                                  | 64     |
| <b>BGP auto-peering EVPN instances</b> —maximum EVPN instances.   | ExtremeSwitching X670-G2, X690, X870, X590, X465, X695, 5420, 5520                                  | 1,024  |
| <b>EAPS domains</b> —maximum number of EAPS domains.<br><br><b>Note:</b> An EAPS ring that is being spatially reused cannot have more than four configured EAPS domains.                    | ExtremeSwitching X870, X690, X590, X465, X695   | 128    |
|   | ExtremeSwitching X670-G2, X450-G2, X460-G2, 5420, 5520  | 64     |
|   | ExtremeSwitching X440-G2, X620  | 32     |
| <b>EAPsv2 protected VLANs</b> —maximum number of protected VLANs.   | ExtremeSwitching X450-G2, X460-G2, X670-G2, X440-G2, X620, 5420, 5520                               | 500    |
|   | ExtremeSwitching X870, X690, X590, X465, X695   | 2,000  |
| <b>ERPS domains</b> —maximum number of ERPS domains without CFM configured.   | ExtremeSwitching X450-G2, X460-G2, X670-G2, X620, X440-G2, X870, X690, X590, X465, X695, 5420, 5520 | 32     |
| <b>ERPS domains</b> —maximum number of ERPS domains with CFM configured.  | ExtremeSwitching X450-G2, X670-G2, X620, X870, X690, X590, X465, X695, 5420, 5520                   | 16     |
|   | ExtremeSwitching X460-G2  | 32     |
| <b>ERPSv1 protected VLANs</b> —maximum number of protected VLANs.   | ExtremeSwitching X450-G2, X460-G2, X670-G2, X870, X690, X590, X465, X695, 5420, 5520                | 2,000  |
|   | ExtremeSwitching X620, X440-G2  | 1,000  |

**Table 9: Supported Limits for Advanced Edge and Base License (continued)**

| Metric  | Product   | Limit  |
|---|---|--------|
| ERPSv2 protected VLANs—maximum number of protected VLANs.                                       | ExtremeSwitching X450-G2, X460-G2, X670-G2, X870, X690, X590, X465, X695, 5420, 5520                | 2,000  |
|   | ExtremeSwitching X620, X440-G2  | 500    |
| ESRP groups—maximum number of ESRP groups   | ExtremeSwitching X450-G2, X460-G2, X670-G2, X440-G2, X620, X870, X690, X590, X465, X695, 5420, 5520 | 32     |
| ESRP domains—maximum number of ESRP domains.  | ExtremeSwitching X450-G2, X460-G2, X670-G2, X620, X440-G2, X870, X690, X590, X465, X695, 5420, 5520 | 64     |
| ESRP L2 VLANs—maximum number of ESRP VLANs without an IP address configured.                    | ExtremeSwitching X450-G2, X460-G2, X670-G2, X620, X440-G2, X870, X690, X590, X465, X695, 5420, 5520 | 1,000  |
| ESRP L3 VLANs—maximum number of ESRP VLANs with an IP address configured.                       | ExtremeSwitching X450-G2, X460-G2, X670-G2, X620, X440-G2, X870, X690, X590, X465, X695, 5420, 5520 | 511    |
| ESRP (maximum ping tracks)—maximum number of ping tracks per VLAN.                              | ExtremeSwitching X450-G2, X460-G2, X670-G2, X620, X440-G2, X870, X690, X590, X465, X695, 5420, 5520 | 8      |
| ESRP (IP route tracks)—maximum IP route tracks per VLAN.  | ExtremeSwitching X450-G2, X460-G2, X670-G2, X620, X440-G2, X870, X690, X590, X465, X695, 5420, 5520 | 8      |
| ESRP (VLAN tracks)—maximum number of VLAN tracks per VLAN.                                      | ExtremeSwitching X450-G2, X460-G2, X670-G2, X620, X440-G2, X870, X690, X590, X465, X695, 5420, 5520 | 1      |
| OSPFv2/v3 ECMP—maximum number of equal cost multipath OSPFv2 and OSPFv3.                        | ExtremeSwitching X460-G2, X670-G2, X450-G2, X870, X690, X590, X465, X695                            | 64     |
|   | ExtremeSwitching 5420, 5520   | 8      |
|   | ExtremeSwitching X620   | 4      |
|   | ExtremeSwitching X440-G2  | N/A    |
| OSPFv2 areas—as an ABR, how many OSPF areas are supported within the same switch.               | ExtremeSwitching X460-G2, X670-G2, X870, X690, X590, X465, X695, 5420, 5520                         | 8      |
|   | ExtremeSwitching X450-G2, X440-G2, X620   | 4      |
| OSPFv2 external routes—recommended maximum number of external routes contained in an OSPF LSDB. | ExtremeSwitching X870, X690, X590, X465, X695   | 10,000 |
|   | ExtremeSwitching X670-G2, X460-G2, 5520   | 5,000  |
|   | ExtremeSwitching 5420   | 4,000  |
|   | ExtremeSwitching X450-G2, X440-G2, X620   | 2,400  |

**Table 9: Supported Limits for Advanced Edge and Base License (continued)**

| Metric  | Product   | Limit  |
|---|---|--------|
| <b>OSPFv2 inter- or intra-area routes</b> —recommended maximum number of inter- or intra-area routes contained in an OSPF LSDB with one ABR in OSPF domain. | ExtremeSwitching X870, X690, X590, X465, X695   | 4,000  |
|   | ExtremeSwitching X670-G2, X460-G2, 5420, 5520   | 2,000  |
|   | ExtremeSwitching 5420   | 1,600  |
|   | ExtremeSwitching X450-G2, X440-G2, X620   | 1,000  |
| <b>OSPFv2 interfaces</b> —recommended maximum number of OSPF interfaces on a switch (active interfaces only).   | ExtremeSwitching X450-G2, X460-G2, X670-G2, X620, X440-G2, X870, X690, X590, X465, X695, 5420, 5520 | 4      |
| <b>OSPFv2 links</b> —maximum number of links in the router LSA.   | ExtremeSwitching X460-G2, X670-G2, X870, X690, X590, X465, X695, 5520                               | 400    |
|   | ExtremeSwitching 5420   | 320    |
|   | ExtremeSwitching X450-G2, X620, X440-G2   | 4      |
| <b>OSPFv2 neighbors</b> —maximum number of supported OSPF adjacencies.  | ExtremeSwitching X450-G2, X670-G2, X460-G2, X440-G2, X620, X870, X690, X590, X465, X695, 5420, 5520 | 4      |
| <b>OSPFv2 routers in a single area</b> —recommended maximum number of routers in a single OSPF area.  | ExtremeSwitching X870, X690, X590, X465, X695   | 100    |
|   | ExtremeSwitching X670-G2, X460-G2, 5520   | 50     |
|   | ExtremeSwitching 5420   | 40     |
|   | ExtremeSwitching X450-G2, X440-G2, X620   | 4      |
| <b>OSPFv2 virtual links</b> —maximum number of supported OSPF virtual links.  | ExtremeSwitching X460-G2, X670-G2, X870, X690, X590, X465, X695, 5520                               | 32     |
|   | ExtremeSwitching 5420   | 25     |
|   | ExtremeSwitching X450-G2, X440-G2, X620   | 4      |
| <b>OSPFv3 areas</b> —as an ABR, the maximum number of supported OSPFv3 areas.   | ExtremeSwitching X870, X690, X590, X465, X695   | 100    |
|   | ExtremeSwitching X460-G2, X670-G2, 5520   | 16     |
|   | ExtremeSwitching 5420   | 12     |
|   | ExtremeSwitching X450-G2, X440-G2, X620   | 4      |
| <b>OSPFv3 external routes</b> —recommended maximum number of external routes.   | ExtremeSwitching X670-G2, X460-G2, X870, X690, X590, X465, X695, 5520                               | 10,000 |
|   | ExtremeSwitching 5420   | 7,500  |
|   | ExtremeSwitching X450-G2, X440-G2, X620   | 1,200  |



**Table 9: Supported Limits for Advanced Edge and Base License (continued)**

| Metric  | Product   | Limit                                 |
|---|---|---------------------------------------|
| OSPFv3 inter- or intra-area routes—recommended maximum number of inter- or intra-area routes. | ExtremeSwitching X870, X690, X590, X465, X695   | 4,000                                 |
|   | ExtremeSwitching X670-G2, X460-G2, 5520   | 3,000                                 |
|   | ExtremeSwitching X450-G2, X440-G2, X620, 5420   | 500                                   |
| OSPFv3 interfaces—maximum number of OSPFv3 interfaces (active interfaces only).               | ExtremeSwitching X670-G2, X460-G2, X450-G2, X870, X690, X440-G2, X620, X590, X465, X695, 5420, 5520 | 4                                     |
| OSPFv3 neighbors—maximum number of OSPFv3 neighbors.  | ExtremeSwitching X450-G2, X670-G2, X460-G2, X870, X690, X440-G2, X620, X590, X465, X695, 5420, 5520 | 4                                     |
| OSPFv3 virtual links—maximum number of OSPFv3 virtual links supported.                        | ExtremeSwitching X670-G2, X460-G2, X870, X690, X590, X465, X695, 5520                               | 16                                    |
|   | ExtremeSwitching 5420   | 12                                    |
|   | ExtremeSwitching X450-G2, X440-G2, X620   | 4                                     |
| PIM IPv4 (maximum interfaces)—maximum number of PIM active interfaces.                        | ExtremeSwitching X460-G2, X670-G2, X450-G2, X870, X440-G2, X620, X690, X590, X465, X695             | 4                                     |
| PIM IPv4 Limits—maximum number of multicast groups per dynamic rendezvous point.              | ExtremeSwitching X450-G2, X460-G2, X670-G2, X620, X440-G2, X870, X690, X590, X465, X695, 5420, 5520 | 180                                   |
| PIM IPv4 Limits—maximum number of multicast groups per static rendezvous point.               | ExtremeSwitching X450-G2, X460-G2, X670-G2, X620, X440-G2, X870, X690, X590, X465, X695, 5420, 5520 | 3,000 (depends on policy file limits) |
| PIM IPv4 Limits—maximum number of multicast sources per group.                                | ExtremeSwitching X460-G2, X670-G2, X450-G2, X870, X690, X590, X465, X695, 5420, 5520                | 5,000                                 |
|   | ExtremeSwitching X440-G2, X620  | 1,500                                 |
| PIM IPv4 Limits—maximum number of dynamic rendezvous points per multicast group.              | ExtremeSwitching X450-G2, X460-G2, X670-G2, X620, X440-G2, X870, X690, X590, X465, X695, 5420, 5520 | 145                                   |
| PIM IPv4 Limits—static rendezvous points.   | ExtremeSwitching X450-G2, X460-G2, X670-G2, X620, X440-G2, X870, X690, X590, X465, X695, 5420, 5520 | 32                                    |
| PIM IPv6 (maximum interfaces)—maximum number of PIM active interfaces.                        | ExtremeSwitching X460-G2, X670-G2, X450-G2, X870, X440-G2, X620, X690, X590, X465, X695             | 4                                     |
| PIM IPv6 Limits—maximum number of multicast sources per group.                                | ExtremeSwitching X460-G2, X670-G2, X870, X690, X590, X465, X695, 5420, 5520                         | 1,750                                 |
|   | ExtremeSwitching X450-G2  | 1,500                                 |
|   | ExtremeSwitching X440-G2, X620  | 550                                   |

**Table 9: Supported Limits for Advanced Edge and Base License (continued)**

| Metric  | Product   | Limit                                    |
|---|---|--|
| <b>PIM IPv6 Limits</b> —maximum number of multicast groups per dynamic rendezvous point.  | ExtremeSwitching X450-G2, X460-G2, X670-G2, X620, X440-G2, X870, X690, X590, X465, X695, 5420, 5520 | 70                                       |
| <b>PIM IPv6 Limits</b> —maximum number of multicast groups per static rendezvous point.   | ExtremeSwitching X450-G2, X460-G2, X670-G2, X620, X440-G2, X870, X690, X590, X465, X695, 5420, 5520 | 3,000<br>(depends on policy file limits) |
| <b>PIM IPv6 Limits</b> —maximum number of dynamic rendezvous points per multicast group.  | ExtremeSwitching X450-G2, X460-G2, X670-G2, X620, X440-G2, X870, X690, X590, X465, X695, 5420, 5520 | 64                                       |
| <b>PIM IPv6 Limits</b> —maximum number of secondary addresses per interface.  | ExtremeSwitching X450-G2, X460-G2, X670-G2, X620, X440-G2, X870, X690, X590, X465, X695, 5420, 5520 | 70                                       |
| <b>PIM IPv6 Limits</b> —static rendezvous points.   | ExtremeSwitching X450-G2, X460-G2, X670-G2, X620, X440-G2, X870, X690, X590, X465, X695, 5420, 5520 | 32                                       |
| <b>Port-specific VLAN tags</b> —maximum number of port-specific VLAN tags.  | ExtremeSwitching X460-G2, X670-G2, X770, X870, X690, X590, X465                                     | 1,023                                    |
|   | ExtremeSwitching X450-G2, X440-G2, X620, 5420, 5520, X695   | N/A                                      |
| <b>Port-specific VLAN tags</b> —maximum number of port-specific VLAN tag ports.   | ExtremeSwitching X460-G2, X670-G2, X870, X690, X590, X465   | 4,000                                    |
|   | ExtremeSwitching X450-G2, X440-G2, X620, 5420, 5520, X695   | N/A                                      |
| <b>VLAN Port Interfaces (VPIF)</b> —maximum number of VLAN port interfaces.   | ExtremeSwitching X460-G2  | 65,536                                   |
|   | ExtremeSwitching 5420   | 60,000                                   |
|   | ExtremeSwitching X465, X590, X670-G2, X690, X870, X695, 5520  | 131,585                                  |
| <b>VRRP (v2/v3-IPv4) (maximum instances)</b> —maximum number of VRRP instances for a single switch, with Advanced Edge license or higher.<br><br><b>Note:</b> These limits are applicable for Fabric Routing configuration also.<br><br><b>Note:</b> Number of groups configured should not exceed the number of individual VRs supported (that is, in normal mode) for that platform type. | <b>Normal Mode (as individual VRs):</b>   |  |
|   | ExtremeSwitching X670-G2, X460-G2, X450-G2, X870, X690, X590, X465, X695, 5420, 5520                | 511                                      |
|   | ExtremeSwitching X440-G2, X620  | 128                                      |
|   | <b>Scaled Mode (with groups):</b>   |  |
|   | ExtremeSwitching X670-G2, X460-G2, X450-G2, X870, X690, X590, X465, X695, 5420, 5520                | 2,048                                    |
|   | ExtremeSwitching X440-G2, X620  | 128                                      |
| <b>Sliced Mode:</b>   |   |  |
| ExtremeSwitching 5420, 5520   | 511   |  |

**Table 9: Supported Limits for Advanced Edge and Base License (continued)**

| Metric   | Product   | Limit   |
|--|---|---|
| <b>VRRP (v3-IPv6) (maximum instances)</b> —maximum number of VRRP instances for a single switch, with Advanced Edge or Base license, or higher. (VRRP-VRRPv3-IPv6)<br><br><b>Note:</b> These limits are applicable for Fabric Routing configuration also.<br><br><b>Note:</b> Number of groups configured should not exceed the number of individual VRs supported (that is, in normal mode) for that platform type. | <b>Normal Mode (as individual VRs):</b><br>ExtremeSwitching X670-G2, X460-G2, X450-G2, X870, X690, X590, X465, X695, 5420, 5520                               | 511   |
|  | ExtremeSwitching X440-G2, X620  | 128   |
|  | <b>Scaled Mode (with groups):</b><br>ExtremeSwitching X670-G2, X460-G2, X450-G2, X870, X690, X590, X465, X695, 5420, 5520                                     | 2,048   |
|  | ExtremeSwitching X440-G2, X620  | 128   |
| <b>VRRP (v2/v3-IPv4/IPv6) (maximum VRID)</b> —maximum number of unique VRID numbers per switch.  | ExtremeSwitching X670-G2, X460-G2, X450-G2, X440-G2, X620, X870, X690, X590, X465, X695, 5420, 5520<br><br><b>Note:</b> With Advanced Edge license or higher. | 255   |
| <b>VRRP (v2/v3-IPv4/IPv6) (maximum VRIDs per VLAN)</b> —maximum number of VRIDs per VLAN.  | ExtremeSwitching X670-G2, X460-G2, X450-G2, X440-G2, X620, X870, X690, X590, X465, X695, 5420, 5520<br><br><b>Note:</b> With Advanced Edge license or higher. | 255   |
| <b>VRRP (v2/v3-IPv4/IPv6) (maximum ping tracks)</b> —maximum number of ping tracks per VLAN.   | ExtremeSwitching X450-G2, X460-G2, X670-G2, X620, X440-G2, X870, X690, X590, X465, X695, 5420, 5520<br><br><b>Note:</b> With Advanced Edge license or higher. | 8   |
| <b>VRRP (maximum ping tracks)</b> —maximum number of ping tracks per VRRP Instance under 128 VRRP instances, with Advanced Edge license or higher.   | ExtremeSwitching X450-G2, X460-G2, X670-G2, X620, X440-G2, X870, X690, X590, X465, X695, 5420, 5520   | 8 (20 centisecond or 1 second hello interval) |
| <b>VRRP (v3-IPv6) (maximum ping tracks)</b> —maximum number of ping tracks per VRRP Instance under 128 VRRP instances, with Advanced Edge license or higher.   | ExtremeSwitching X450-G2, X460-G2, X670-G2, X620, X440-G2, X870, X690, X590, X465, X695, 5420, 5520   | 8 (20 centisecond or 1 second hello interval) |
| <b>VRRP (v2/v3-IPv4/IPv6) (maximum iproute tracks)</b> —maximum number of IP route tracks per VLAN.  | ExtremeSwitching X450-G2, X460-G2, X670-G2, X620, X440-G2, X870, X690, X590, X465, X695, 5420, 5520   | 8   |

**Table 9: Supported Limits for Advanced Edge and Base License (continued)**

| Metric   | Product   | Limit                                 |
|--|---|---------------------------------------|
| <b>VRRP (v2/v3-IPv4/IPv6)</b> —maximum number of VLAN tracks per VLAN.   | ExtremeSwitching X450-G2, X460-G2, X670-G2, X620, X440-G2, X870, X690, X590, X465, X695, 5420, 5520   | 8                                     |
| <b>VXLAN</b> —maximum virtual networks.<br><br><b>Note:</b> Every VPLS instance/PSTag VLAN reduces this limit by 1.<br><br><b>Note:</b> 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. | ExtremeSwitching X670-G2, X870, X690, X590, X465, X695, 5420, 5520<br><br>ExtremeSwitching 5420<br><br>ExtremeSwitching X460-G2, X450-G2, X440-G2, X620 | 2,048–4,000<br><br>200–375<br><br>N/A |
| <b>VXLAN</b> —maximum tenant VLANs plus port combinations<br><br><b>Note:</b> Every (VPLS/PSTag VLAN) + port reduces the limit by 1.   | ExtremeSwitching X670-G2, X870, X690, X590, X465, X695, 5420, 5520<br><br>ExtremeSwitching 5420<br><br>ExtremeSwitching X460-G2, X450-G2, X440-G2, X620 | 4,096<br><br>200–375<br><br>N/A       |
| <b>VXLAN</b> —maximum static MAC to IP bindings.<br><br><b>Note:</b> Every FDB entry configured reduces this limit by 1.   | ExtremeSwitching X670-G2, X870, X690, X590, X465, X695, 5420, 5520<br><br>ExtremeSwitching X460-G2, X450-G2, X440-G2, X620                              | 64,000<br><br>N/A                     |
| <b>VXLAN</b> —maximum RTEP IP addresses  | ExtremeSwitching X670-G2, X870, X690, X590, X465, X695, 5420, 5520<br><br>ExtremeSwitching X460-G2, X450-G2, X440-G2, X620                              | 512<br><br>N/A                        |
| <b>VXLAN</b> —maximum virtual networks with dynamic learning and OSPF extensions for VXLAN   | ExtremeSwitching X670-G2, X870, X690, X590, X465, X695, 5420, 5520<br><br>ExtremeSwitching 5420<br><br>ExtremeSwitching X460-G2, X450-G2, X440-G2, X620 | 4,000<br><br>375<br><br>N/A           |
| <b>VXLAN</b> —or replicator role, maximum number of attached leaves per switch.  | ExtremeSwitching X465, X590, X670-G2, X690, X695, X870, 5420, 5520  | 256                                   |

## Core and Premier License Limits

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

**Table 10: Supported Limits for Core and Premier License**

| Metric   | Product   | Limit  |
|--|---|--------|
| <b>Anycast RP Using PIM</b> —maximum number of IPv4 Anycast RP set per VR.   | ExtremeSwitching X440-G2, X450-G2, X460-G2, X670-G2, X620, X690, X870, X590, X465, X695, 5420, 5520 | 32     |
| <b>Anycast RP Using PIM</b> —maximum number of IPv6 Anycast RP set per VR.   | ExtremeSwitching X440-G2, X450-G2, X460-G2, X670-G2, X620, X690, X870, X590, X465, X695, 5420, 5520 | 32     |
| <b>Anycast RP Using PIM</b> —RP peers per Anycast RP set.  | ExtremeSwitching X440-G2, X450-G2, X460-G2, X670-G2, X620, X690, X870, X590, X465, X695, 5420, 5520 | 10     |
| <b>BGP (aggregates)</b> —maximum number of BGP aggregates.   | ExtremeSwitching X460-G2, X670-G2, X870, X690, X590, X465, X695, 5520                               | 256    |
|  | ExtremeSwitching X450-G2, 5420  | 204    |
| <b>BGP (networks)</b> —maximum number of BGP networks.   | ExtremeSwitching X460-G2, X670-G2, X870, X690, X590, X465, X695, 5520                               | 1,024  |
|  | ExtremeSwitching X450-G2, 5420  | 820    |
| <b>BGP (peers)</b> —maximum number of BGP peers.<br><br><b>Note:</b> With default keepalive and hold timers.<br><br><b>Note:</b> Each BGPv4/BGPv6 peer handles a maximum of 50 routes.<br><br><b>Note:</b> ECMP should not be enabled for BGP. | ExtremeSwitching X460-G2, X670-G2, X870, 5520   | 128    |
|  | ExtremeSwitching , X590, X465, X695   | 300    |
|  | ExtremeSwitching X450-G2, 5420  | 100    |
|  | ExtremeSwitching X690   | 500    |
| <b>BGP (peer groups)</b> —maximum number of BGP peer groups.   | ExtremeSwitching X460-G2, X670-G2, X870, X690, X590, X465, X695, 5520                               | 64     |
|  | ExtremeSwitching X450-G2, 5420  | 50     |
| <b>BGP (policy entries)</b> —maximum number of BGP policy entries per route policy.  | ExtremeSwitching X460-G2, X670-G2, X870, X690, X590, X465, X695, 5520                               | 256    |
|  | ExtremeSwitching X450-G2, 5420  | 204    |
| <b>BGP (policy statements)</b> —maximum number of BGP policy statements per route policy.  | ExtremeSwitching X460-G2, X670-G2, X870, X690, X590, X465, X695, 5520                               | 1,024  |
|  | ExtremeSwitching X450-G2, 5420  | 820    |
| <b>BGP multicast address-family routes</b> —maximum number of multicast address-family routes.   | ExtremeSwitching X460-G2, X670-G2, X870, X690, X590, X465, X695, 5520                               | 25,000 |
|  | ExtremeSwitching X450-G2, 5420  | 20,000 |

**Table 10: Supported Limits for Core and Premier License (continued)**

| Metric   | Product   | Limit                  |
|--|---|------------------------|
| <b>BGP (unicast address-family routes)</b> —maximum number of unicast address-family routes.   | ExtremeSwitching X460-G2, X670-G2, X870, X690, X590 , X465 , X695, 5520 (at default)  | 25,000                 |
|  | ExtremeSwitching X870, X690, X590 , X465 (with ALPM enabled)                          | 100,000                |
|  | ExtremeSwitching X450-G2  | 20,000                 |
|  | ExtremeSwitching 5420   | 20,000                 |
|  | ExtremeSwitching 5520 (with ALPM enabled)   | 80,000                 |
| <b>BGP (non-unique routes)</b> —maximum number of non-unique BGP routes.                       | ExtremeSwitching X460-G2, X670-G2, X870, X690, X590, X465, X695, 5520                 | 25,000                 |
|  | ExtremeSwitching X450-G2, 5420  | 20,000                 |
| <b>BGP ECMP</b> —maximum number of equal cost paths per multipath for BGP and BGPv6.           | ExtremeSwitching X460-G2, X670-G2, X870, X690, X590, X465, X695                       | 2, 4, 8, 16, 32, or 64 |
|  | ExtremeSwitching X450-G2  | 64                     |
|  | ExtremeSwitching 5420, 5520   | 8                      |
| <b>BGPv6 (unicast address-family routes)</b> —maximum number of unicast address family routes. | ExtremeSwitching X460-G2, 5420, 5520  | 6,000                  |
|  | ExtremeSwitching X670-G2  | 8,000                  |
|  | ExtremeSwitching X870, X690, X590, X465, X695   | 10,000                 |
|  | ExtremeSwitching X870, X690 (with ALPM enabled)                                       | 100,000                |
|  | ExtremeSwitching X450-G2, 5420  | 4,800                  |
| ExtremeSwitching 5520 (with ALPM enabled)  | 40,000  |                        |
| <b>BGPv6 (non-unique routes)</b> —maximum number of non-unique BGP routes.                     | ExtremeSwitching X460-G2, 5520  | 18,000                 |
|  | ExtremeSwitching X670-G2, X870, X690, X590, X465, X695                                | 24,000                 |
|  | ExtremeSwitching X450-G2, 5420  | 14,000                 |
| <b>EVPN EVI instances</b> —maximum number of EVI instances.                                    | ExtremeSwitching X670-G2, X870, X690, X590, X465, X695, 5420, 5520                    | 1,024                  |
| <b>EVPN LAGs</b> —maximum number of LAGs.  | ExtremeSwitching X670-G2, X870, X690, X590, X465, X695                                | 128                    |
| <b>GRE Tunnels</b> —maximum number of GRE tunnels.   | ExtremeSwitching X460-G2, X670-G2, X450-G2, X870, X690, X590, X465 , X695, 5420, 5520 | 255                    |
|  | ExtremeSwitching X620, X440G2   | N/A                    |
| <b>IS-IS adjacencies</b> —maximum number of supported IS-IS adjacencies.                       | ExtremeSwitching X460-G2, X670-G2, X870, X690, X590, X465, X695, 5420, 5520           | 128                    |
|  | ExtremeSwitching X450-G2  | N/A                    |

**Table 10: Supported Limits for Core and Premier License (continued)**

| Metric   | Product   | Limit      |
|--|---|------------|
| IS-IS ECMP—maximum number of equal cost paths per multipath for IS-IS.   | ExtremeSwitching X460-G2, X670-G2, X870, X690, X590, X465, X695, 5420, 5520       | 2, 4, or 8 |
|  | ExtremeSwitching X450-G2  | N/A        |
| IS-IS interfaces—maximum number of interfaces that can support IS-IS.  | ExtremeSwitching X460-G2, X670-G2, X770, X870, X690, X590, X465, X695, 5420, 5520 | 255        |
|  | ExtremeSwitching X450-G2  | N/A        |
| IS-IS routers in an area—recommended maximum number of IS-IS routers in an area.   | ExtremeSwitching X460-G2, X670-G2, X870, X690, X590, X465, X695, 5420, 5520       | 256        |
|  | ExtremeSwitching X450-G2  | N/A        |
| IS-IS route origination—recommended maximum number of routes that can be originated by an IS-IS node.  | ExtremeSwitching X460-G2, X670-G2, X870, X690, X590, X465, X695, 5420, 5520       | 20,000     |
|  | ExtremeSwitching 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.   | ExtremeSwitching X460-G2, X670-G2, X870, X690, X590, X465, X695, 5420, 5520       | 25,000     |
|  | ExtremeSwitching X450-G2  | N/A        |
| IS-IS IPv4 L2 routes—recommended maximum number of IS-IS Level 2 routes.   | ExtremeSwitching X460-G2, X670-G2, X870, X690, X590, X465, X695, 5420, 5520       | 25,000     |
|  | ExtremeSwitching 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.   | ExtremeSwitching X460-G2, X670-G2, X870, X690, X590, X465, X695, 5420, 5520       | 20,000     |
|  | ExtremeSwitching 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.   | ExtremeSwitching X460-G2, X670-G2, X870, X690, X590, X465, X695, 5420, 5520       | 10,000     |
|  | ExtremeSwitching X450-G2  | N/A        |
| IS-IS IPv6 L2 routes—recommended maximum number of IS-IS Level 2 routes.   | ExtremeSwitching X460-G2, X670-G2, X870, X690, X590, X465, X695, 5420, 5520       | 10,000     |
|  | ExtremeSwitching 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/L2 router.  | ExtremeSwitching X460-G2, X670-G2, X870, X690, X590, X465, X695, 5420, 5520       | 10,000     |
|  | ExtremeSwitching 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. | ExtremeSwitching X460-G2, X670-G2, X870, X690, X590, X465, X695, 5420, 5520       | 20,000     |
|  | ExtremeSwitching X450-G2  | N/A        |

**Table 10: Supported Limits for Core and Premier License (continued)**

| Metric   | Product  | Limit  |
|--|--|--------|
| <b>IS-IS IPv4/IPv6 L2 routes in an L2 router</b> —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.           | ExtremeSwitching X460-G2, X670-G2, X870, X690, X590, X465, X695, 5420, 5520          | 20,000 |
|  | ExtremeSwitching X450-G2   | N/A    |
| <b>IS-IS IPv4/IPv6 L1 routes in an L1/L2 router</b> —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. | ExtremeSwitching X460-G2, X670-G2, X870, X690, X590, X465, X695, 5420, 5520          | 20,000 |
|  | ExtremeSwitching X450-G2   | N/A    |
| <b>MSDP active peers</b> —maximum number of active MSDP peers.   | ExtremeSwitching X450-G2, X670-G2, X460-G2, X870, X690, X590, X465, X695, 5420, 5520 | 64     |
| <b>MSDP SA cache entries</b> —maximum number of entries in SA cache.   | ExtremeSwitching X670-G2, X690, X590, X465, X695, 5520                               | 14,000 |
|  | ExtremeSwitching 5420M   | 8,000  |
|  | ExtremeSwitching 5420F   | 6,000  |
|  | ExtremeSwitching X460-G2   | 10,000 |
|  | ExtremeSwitching X870  | 11,000 |
|  | ExtremeSwitching X450-G2   | 8,000  |
| <b>MSDP maximum mesh groups</b> —maximum number of MSDP mesh groups.   | ExtremeSwitching X450-G2, X670-G2, X460-G2, X870, X690, X590, X465, X695, 5420, 5520 | 16     |
| <b>OSPFv2/v3 ECMP</b> —maximum number of equal cost multipath OSPFv2 and OSPFv3.   | ExtremeSwitching X460-G2, X670-G2, X450-G2, X870, X690, X590, X465, X695             | 64     |
|  | ExtremeSwitching 5420, 5520  | 8      |
| <b>OSPFv2 areas</b> —as an ABR, how many OSPF areas are supported within the same switch.  | ExtremeSwitching X450-G2, X460-G2, X670-G2, X870, X690, X590, X465, X695, 5420, 5520 | 8      |
| <b>OSPFv2 external routes</b> —recommended maximum number of external routes contained in an OSPF LSDB.  | ExtremeSwitching X870, X690, X590, X465, X695  | 10,000 |
|  | ExtremeSwitching X670-G2, X460-G2, 5520  | 5,000  |
|  | ExtremeSwitching X450-G2, 5420   | 4,000  |
| <b>OSPFv2 inter- or intra-area routes</b> —recommended maximum number of inter- or intra-area routes contained in an OSPF LSDB with one ABR in OSPF domain.  | ExtremeSwitching X870, X690, X590, X465, X695  | 4,000  |
|  | ExtremeSwitching X670-G2, X460-G2, 5520  | 2,000  |
|  | ExtremeSwitching X450-G2, 5420   | 1,600  |
| <b>OSPFv2 interfaces</b> —recommended maximum number of OSPF interfaces on a switch (active interfaces only).  | ExtremeSwitching X460-G2, X670-G2, X870, X690, X590, X465, X695, 5520                | 400    |
|  | ExtremeSwitching X450-G2, 5420   | 320    |



**Table 10: Supported Limits for Core and Premier License (continued)**

| Metric  | Product  | Limit  |
|---|--|--------|
| OSPFv2 links—maximum number of links in the router LSA.                                       | ExtremeSwitching X460-G2, X670-G2, X870, X690, X590, X465, X695, 5520                | 400    |
|   | ExtremeSwitching X450-G2, 5420   | 320    |
| OSPFv2 neighbors—maximum number of supported OSPF adjacencies.                                | ExtremeSwitching X670-G2, X460-G2, X870, X690, X590, X465, X695, 5520                | 128    |
|   | ExtremeSwitching X450-G2, 5420   | 96     |
| OSPFv2 routers in a single area—recommended maximum number of routers in a single OSPF area.  | ExtremeSwitching X870, X690, X590, X465, X695  | 100    |
|   | ExtremeSwitching X670-G2, X460-G2, 5520  | 50     |
|   | ExtremeSwitching X450-G2, 5420   | 40     |
| OSPFv2 virtual links—maximum number of supported OSPF virtual links.                          | ExtremeSwitching X460-G2, X670-G2, X870, X690, X590, X465, X695, 5520                | 32     |
|   | ExtremeSwitching X450-G2, 5420   | 25     |
| OSPFv3 areas—as an ABR, the maximum number of supported OSPFv3 areas.                         | ExtremeSwitching X870, X690, X590, X465, X695  | 100    |
|   | ExtremeSwitching X460-G2, X670-G2, 5520  | 16     |
|   | ExtremeSwitching X450-G2, 5420   | 12     |
| OSPFv3 external routes—recommended maximum number of external routes.                         | ExtremeSwitching X670-G2, X460-G2, X870, X690, X590, X465, X695, 5520                | 10,000 |
|   | ExtremeSwitching X450-G2, 5420   | 7,500  |
| OSPFv3 inter- or intra-area routes—recommended maximum number of inter- or intra-area routes. | ExtremeSwitching X870, X690, X590, X465, X695  | 4,000  |
|   | ExtremeSwitching X670-G2, X460-G2, 5520  | 3,000  |
|   | ExtremeSwitching X450-G2, 5420   | 500    |
| OSPFv3 interfaces—maximum number of OSPFv3 interfaces (active interfaces only).               | ExtremeSwitching X670-G2, X460-G2, X870, X690, X590, X465, X695, 5520                | 256    |
|   | ExtremeSwitching X450-G2, 5420   | 192    |
| OSPFv3 neighbors—maximum number of OSPFv3 neighbors.  | ExtremeSwitching X670-G2, X460-G2, X870, X690, X590, X465, X695, 5520                | 64     |
|   | ExtremeSwitching X450-G2, 5420   | 48     |
| OSPFv3 virtual links—maximum number of OSPFv3 virtual links supported.                        | ExtremeSwitching X670-G2, X460-G2, X870, X690, X590, X465, X695, 5520                | 16     |
|   | ExtremeSwitching X450-G2, 5420   | 12     |
| PIM IPv4 (maximum interfaces)—maximum number of PIM active interfaces.                        | ExtremeSwitching X450-G2, X460-G2, X670-G2, X870, X690, X590, X465, X695, 5420, 5520 | 255    |

**Table 10: Supported Limits for Core and Premier License (continued)**

| Metric   | Product   | Limit                                    |
|--|---|--|
| <b>PIM IPv4 Limits</b> —maximum number of multicast groups per dynamic rendezvous point. | ExtremeSwitching X450-G2, X460-G2, X670-G2, X870, X690, X590 , X465, X695, 5420, 5520                     | 180                                      |
| <b>PIM IPv4 Limits</b> —maximum number of multicast groups per static rendezvous point.  | ExtremeSwitching X450-G2, X460-G2, X670-G2, X870, X690, X590, X465, X695, 5420, 5520                      | 3,000<br>(depends on policy file limits) |
| <b>PIM IPv4 Limits</b> —maximum number of multicast sources per group.                   | ExtremeSwitching X450-G2, X460-G2, X670-G2, X870, X690, X590 , X465, X695, 5420, 5520                     | 5,000                                    |
| <b>PIM IPv4 Limits</b> —maximum number of dynamic rendezvous points per multicast group. | ExtremeSwitching X450-G2, X460-G2, X670-G2, X870, X690, X590 , X465, X695, 5420, 5520                     | 145                                      |
| <b>PIM IPv4 Limits</b> —static rendezvous points.  | ExtremeSwitching X450-G2, X460-G2, X670-G2, X870, X690, X590 , X465, X695, 5420, 5520                     | 32                                       |
| <b>PIM IPv6 (maximum interfaces)</b> —maximum number of PIM active interfaces.           | ExtremeSwitching X450-G2, X460-G2, X670-G2, X870, X690, X590 , X465, X695, 5420, 5520                     | 255                                      |
| <b>PIM IPv6 Limits</b> —maximum number of multicast sources per group.                   | ExtremeSwitching X460-G2, X670-G2, X870, X690, X590 , X465, X695, 5420, 5520<br>ExtremeSwitching X450-G2, | 1,750<br>1,500                           |
| <b>PIM IPv6 Limits</b> —maximum number of multicast groups per dynamic rendezvous point. | ExtremeSwitching X450-G2, X460-G2, X670-G2, X870, X690, X590 , X465, X695, 5420, 5520                     | 70                                       |
| <b>PIM IPv6 Limits</b> —maximum number of multicast groups per static rendezvous point.  | ExtremeSwitching X450-G2, X460-G2, X670-G2, X870, X690, X590, X465, X695, 5420, 5520                      | 3,000<br>(depends on policy file limits) |
| <b>PIM IPv6 Limits</b> —maximum number of dynamic rendezvous points per multicast group. | ExtremeSwitching X450-G2, X460-G2, X670-G2, X870, X690, X590 , X465, X695, 5420, 5520                     | 64                                       |
| <b>PIM IPv6 Limits</b> —maximum number of secondary addresses per interface.             | ExtremeSwitching X450-G2, X460-G2, X670-G2, X870, X690, X590 , X465, X695, 5420, 5520                     | 70                                       |
| <b>PIM IPv6 Limits</b> —static rendezvous points.  | ExtremeSwitching X450-G2, X460-G2, X670-G2, X870, X690, X590 , X465, X695, 5420, 5520                     | 32                                       |

## Notes for Limits Tables

- <sup>a</sup> 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.
- <sup>c</sup> When there are BFD sessions with minimal timer, sessions with default timer should not be used.

- 
- <sup>f</sup> Effective capacity varies based on actual MAC addresses and VLAN IDs used and hash algorithm selected.
  - <sup>g</sup> Based on "configure forwarding internal-tables more l2".
  - <sup>h</sup> Based on "configure forwarding internal-tables more l3-and-ipmc".
  - <sup>j</sup> The limit depends on setting configured with configure iproute reserved-entries.
  - <sup>m</sup> 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.
  - <sup>n</sup> If IGMP and MLD are simultaneously configured on the switch, the number of effective subscribers supported are lessened accordingly.
  - <sup>o</sup> The total of all PBR next hops on all flow redirects should not exceed 4,096.
  - <sup>p</sup> The number of XNV authentications supported based on system ACL limitations.
  - <sup>q</sup> Based on "configure forwarding internal-tables more routes".
  - <sup>r</sup> Based on `configure forwarding internal-tables more routes ipv6-mask-length 128`.
  - <sup>s</sup> Based on `configure forwarding internal-tables more l3-and-ipmc` or `configure forwarding internal-tables l2-and-l3`.



# Open Issues, Known Behaviors, and Resolved Issues

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[Open Issues on page 84](#)

[Known Behaviors on page 85](#)

[Resolved Issues in ExtremeXOS 31.5 on page 86](#)

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

## Open Issues

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The following are new open issues for supported features found in ExtremeXOS 31.5.

| Defect Number                                | Description   |
|--|---|
| <b>General</b>                               |   |
| EXOS-29818                                   | Duplicate mibIfEntry query from ports.py and vlan.py affects performance.   |
| EXOS-30211                                   | Auto-provision causes a port to be removed from the STP "s0" domain.  |
| <b>ExtremeSwitching 5420 Series Switches</b> |   |
| EXOS-29875                                   | When MACsec and EAPS (Ethernet Automatic Protection Switching) are enabled on the same port, the EAPS protocol takes approximately five seconds to converge after the link is healed (for example: the cable is reconnected). Typical EAPS convergence time is about 50 milliseconds.<br>Workaround:<br>If the longer convergence time is not acceptable, then do not enable MACsec on any 5420 EAPS links. |
| <b>MACsec</b>                                |   |
| EXOS-29966                                   | While disabling MACSec on multiple ports, some error log messages are seen:<br>(CIT_31.5.0.300) 5420F-16MW-32P-4XE-EXOS.6 # 09/14/2021 10:18:19.39 <Error:EDP.ProcPDUFail> PDU received on port 1:5 could not be processed, invalid SNAP (llcSnapType = 657d, edp_snap_id = bb00)<br>Workaround:<br>Disable MACSec on only one port at a time.  |
| <b>SNMP</b>                                  |   |
| EXOS-29863                                   | A "Process netTools pid 1926 died with signal 6" crash is seen during silvercreek snmpv1 testsuite run in ExtremeXOS 31.5.  |
| <b>Universal Hardware</b>                    |   |

| Defect Number | Description   |
|---------------|---|
| EXOS-29882    | An error message is reported during rescue following a VOSS to EXOS conversion:<br><pre>ubiattach: error!: cannot attach "/dev/mtd0" error 17 (File exists)</pre> |
| <b>VLAN</b>   |   |
| EXOS-30104    | A CEP port cannot co-exists in a VLAN if the VLAN id and CEP cvids are same.  |
| <b>VXLAN</b>  |   |
| EXOS-29976    | L2 VMAN traffic gets classified in the VxLAN Tenant VMAN.   |

## Known Behaviors

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

**Table 11: Known Issues, Platform-Specific, and Feature Change Requests (CRs)**

| Defect Number                                | Description  |
|--|--|
| <b>General</b>                               |  |
| EXOS-30041                                   | A 'V' flag is displayed in the output after running the <b>show dns cache</b> command with dnsssec disabled.   |
| <b>ExtremeSwitching 5420 Series Switches</b> |  |
| EXOS-29777                                   | On a stacked 5420, ingress mirroring MACsec-encrypted traffic to a port on a different slot will result in an extra 4 byte zero-value header inserted in the position of the VLAN tag.<br>Workaround:<br>Mirroring such traffic to a port on the same slot (where the MACsec source is located) does not have this limitation. |
| <b>ExtremeSwitching 5520 Series Switches</b> |  |
| EXOS-30172                                   | In an Extended Edge Switching stack, an error occurs on slot 2 while loading the structure <code>&lt;ports&gt;</code> after unconfiguring and then restarting the switch.  |

**Table 11: Known Issues, Platform-Specific, and Feature Change Requests (CRs)  
(continued)**

| Defect Number         | Description   |
|-----------------------|---|
| EXOS-30419            | <p>Continuous attempts to authenticate user(s) with Dynamic ACLs (configured via radius Vendor Specific Attribute (VSA) ID 232 - Extreme-Policy-ACL), which would exceed the maximum configured or allowed number of ACLs, may cause a crash on the backup node in a stacked system. The following example log message is an indication this is happening:</p> <pre>1/1/2021 12:00:00.00 &lt;Noti:Policy.SessLmtExcd&gt; Slot-1: Policy 1(policy) assignment by rule [MacSrc  00:00:11:11:22:22 1:1] failed (exceeded blade dynamic acl hardware limits). 1/1/2021 12:00:00.00 &lt;Noti:Policy.SessLmtExcd&gt; Slot-1: Policy 1(policy) assignment by rule [MacSrc  00:00:11:11:22:22 1:1] failed (exceeded blade dynamic acl hardware limits).</pre> <p>Workaround:<br/>Decrease the number of authenticated users or Dynamic ACLs per authenticated user to avoid this crash.</p> |
| <b>SNMP</b>           |   |
| EXOS-30775            | ExtremeXOS modifies the OID of an SNMP get-request instead of returning a "No Such Instance" response for extremePethPsePortTable.  |
| <b>SummitStacking</b> |   |
| EXOS-30060            | In a SummitStack with VPEX enabled, the ELSM state remains down when configured on CB ports.  |
| <b>VXLAN</b>          |   |
| EXOS-29918            | <p>If VMAN CEP egress filtering is applied on a VXLAN underlay or MPLS Network port, traffic does not go through.</p> <p>Workaround:<br/>Run the <b>disable vman cep egress filtering</b> command from the VXLAN underlay port/MPLS network port.</p>   |

## Resolved Issues in ExtremeXOS 31.5

The following issues were resolved in ExtremeXOS 31.5. ExtremeXOS 31.5 includes all fixes up to and including the following versions: 11.6.5.3 and earlier, 12.0.5, 12.1.7, 12.2.2-patch1-12, 12.3.6, 12.4.5, 12.5.5, 12.6.3, 12.6.5, 12.7.1, 15.1.5, 15.2.4, 15.3.3, 15.4.1, 15.5.1, 15.5.2, 15.6.1, 15.6.2, 15.7.1, 16.1, 16.1.2, 16.1.3, 21.1, 22.1,

22.2, 22.3, 22.4, 22.5, 22.6, 30.1, 30.2, 30.3, 30.4, 30.5, 30.6, 30.7, 31.1, 31.2, 31.3, and 31.4. For information about those fixes, see the release notes for the specific release.

**Table 12: Resolved Issues, Platform-Specific, and Feature Change Requests (CRs) in 31.5**

| Defect Number                                   | Description  |
|---|--|
| <b>General</b>                                  |  |
| EXOS-29044                                      | There is a need to display the debug packet capture status under show tech.  |
| EXOS-29722                                      | The <b>show configuration difference</b> command shows the difference in the CFGMGR configuration if the banner has '<' or '>' symbols.                      |
| EXOS-29734                                      | Unable to remove the <code>dhcp-bindings storage</code> filename from configuration.   |
| EXOS-29861                                      | The Netlogin mac password gets lost after a switch reboot.   |
| EXOS-29886                                      | Process aaa pid 1050 ends with signal 6 during a Defensics TACACS-Client test suite run.   |
| EXOS-29891                                      | Process netTools ends with signal 6 while running the Defensics DNS-Client test suite.   |
| EXOS-30101                                      | Fix for vulnerability mentioned in <a href="#">CVE-2021-33909</a> .  |
| <b>ExtremeSwitching X460-G2 Series Switches</b> |  |
| EXOS-29852                                      | The switch fails to ask for the correct password again when a password mismatch occurs while creating an account in enhanced security mode.                  |
| <b>ExtremeSwitching X690 Series Switches</b>    |  |
| EXOS-29439                                      | RTMGR process crashes with signal 11 when an IPv6 tunnel packet is received, despite the switch not having a tunneling configuration.                        |
| EXOS-29723                                      | A HAL.Card.Error is observed when executing the <b>show ports information detail</b> command in ExtremeXOS 31.1 and later releases.                          |
| <b>ExtremeSwitching 5520 Series Switches</b>    |  |
| EXOS-30076                                      | Unable to ping directly connected hosts on a specific VLAN due to a missing local route in the hardware.   |
| <b>Extended Edge Switching</b>                  |  |
| EXOS-29698                                      | VPEX process ends unexpectedly right after Controlling Bridge (CB) boot up if the loaded configuration is different from the previously saved configuration. |
| <b>MACsec</b>                                   |  |
| EXOS-29524                                      | Occasional flaps on MACsec-enabled ports occur when connected to slower-running hardware (for example, the ExtremeSwitching X620 series switch).             |
| <b>MLAG</b>                                     |  |
| EXOS-29874                                      | VPLS/VPWS Improper ARP handling.   |
| <b>OSPFv2</b>                                   |  |
| EXOS-29482                                      | Routes redistribution from OSPF to RIP creates issues when removing NLRI from Routing Policy.  |

**Table 12: Resolved Issues, Platform-Specific, and Feature Change Requests (CRs) in 31.5 (continued)**

| Defect Number | Description   |
|---------------|---|
| SummitStack   |   |
| EXOS-29812    | The SSH connection refuses to connect after stack failover.                           |
| VLAN          |   |
| EXOS-29034    | Users are not able to configure IPv6 addresses with VLAN tag instead of VLAN name.    |
| VXLAN         |   |
| EXOS-29901    | The tunnel with remote endpoint and local endpoint is operationally down for unicast. |