



# ExtremeXOS<sup>®</sup> Feature License Requirements

*for Version 30.1*



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# Table of Contents

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|   |           |
|---|-----------|
| <b>Preface</b> .....  | <b>4</b>  |
| Text Conventions.....                                       | 4         |
| Related Publications.....                                   | 4         |
| Providing Feedback to Us.....                               | 5         |
| Getting Help.....   | 5         |
| <b>Chapter 1: Overview</b> .....                            | <b>7</b>  |
| Displaying the Installed Licenses and Feature Packs.....    | 8         |
| Trial Licenses.....   | 8         |
| <b>Chapter 2: Switch License Features</b> .....             | <b>9</b>  |
| Edge License Features.....                                  | 9         |
| Advanced Edge License Features.....                         | 14        |
| Core License Features.....                                  | 15        |
| <b>Chapter 3: Feature Pack Features</b> .....               | <b>16</b> |
| MPLS Feature Pack.....                                      | 19        |
| Network Timing Feature Pack.....                            | 19        |
| ExtremeSwitching X440-G2 10 Gigabit Port Licensing.....     | 19        |
| ExtremeSwitching X870-96x-8c Switch Port Speed License..... | 20        |
| MAC Security Feature Pack License.....                      | 21        |





# Preface

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

## Text Conventions

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

**Table 1: Notice Icons**

| Icon  | Notice Type    | Alerts you to...   |
|---|----------------|--|
|  | General Notice | Helpful tips and notices for using the product.                        |
|  | Note           | Important features or instructions.                                    |
|  | Caution        | Risk of personal injury, system damage, or loss of data.               |
|  | Warning        | Risk of severe personal injury.  |
| <b><i>New!</i></b>  | New Content    | Displayed next to new content. This is searchable text within the PDF. |

**Table 2: Text Conventions**

| Convention                             | Description   |
|--|---|
| Screen displays                        | This typeface indicates command syntax, or represents information as it appears on the screen.  |
| The words <b>enter</b> and <b>type</b> | When you see the word “enter” in this guide, you must type something, and then press the Return or Enter key. Do not press the Return or Enter key when an instruction simply says “type.”                                |
| <b>[Key]</b> names                     | Key names are written with brackets, such as <b>[Return]</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.  |

## Related Publications

### ExtremeXOS Publications

- [ACL Solutions Guide](#)
- [ExtremeXOS 30.1 Command Reference Guide](#)
- [ExtremeXOS 30.1 EMS Messages Catalog](#)

- *ExtremeXOS 30.1 Feature License Requirements*
- *ExtremeXOS 30.1 User Guide*
- *ExtremeXOS OpenFlow User Guide*
- *ExtremeXOS Quick Guide*
- *ExtremeXOS Legacy CLI Quick Reference Guide*
- *ExtremeXOS Release Notes*
- *Extreme Hardware/Software Compatibility and Recommendation Matrices*
- *Switch Configuration with Chalet for ExtremeXOS 21.x and Later*
- *Using AVB with Extreme Switches*

## Open Source Declarations

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## Providing Feedback to Us

Quality is our first concern at Extreme Networks, and we have made every effort to ensure the accuracy and completeness of this document. We are always striving to improve our documentation and help you work better, so we want to hear from you! We welcome all feedback but especially want to know about:

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

If you would like to provide feedback to the Extreme Networks Information Development team, you can do so in two ways:

- Use our short online feedback form at <https://www.extremenetworks.com/documentation-feedback/>.
- Email us at [documentation@extremenetworks.com](mailto:documentation@extremenetworks.com).

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

## Getting Help

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

- |                       |  |
|-----------------------|--|
| <b>Extreme Portal</b> | Search the GTAC (Global Technical Assistance Center) knowledge base, manage support cases and service contracts, download software, and obtain product licensing, training, and certifications.  |
| <b>The Hub</b>        | 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.         |
| <b>Call GTAC</b>      | For immediate support: 1-800-998-2408 (toll-free in U.S. and Canada) or +1 408-579-2826. For the support phone number in your country, visit: <a href="http://www.extremenetworks.com/support/contact">www.extremenetworks.com/support/contact</a> |

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

- Your Extreme Networks service contract number and/or serial numbers for all involved Extreme Networks products
- A description of the failure
- A description of any action(s) already taken to resolve the problem
- A description of your network environment (such as layout, cable type, other relevant environmental information)
- Network load at the time of trouble (if known)
- The device history (for example, if you have returned the device before, or if this is a recurring problem)
- Any related RMA (Return Material Authorization) numbers

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- 2 Complete the form with your information (all fields are required).
- 3 Select the products for which you would like to receive notifications.



### Note

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

---

- 4 Click **Submit**.

# 1 Overview

## Displaying the Installed Licenses and Feature Packs Trial Licenses

This document introduces the licenses and feature packs available for the ExtremeXOS® 30.1 software and lists the features they support.

The ExtremeXOS software supports the following license options:

- Edge
- Advanced Edge
- Core
- Feature Packs

The Edge license provides a basic feature set and the Core license includes the highest level of functionality. 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 Advanced Edge license. The Core license includes all of the features in the Edge license, Advanced Edge license, plus the features in the Core license. The following table lists the software licenses available for each platform that supports ExtremeXOS software.



### Note

The Advanced Core license is no longer offered.

**Table 3: Standard and Upgrade Licenses for ExtremeXOS Switches**

| Switch Platform                 | Edge License | Advanced Edge License | Core License |
|---------------------------------|--------------|-----------------------|--------------|
| ExtremeSwitching X440-G2 series | Standard     | Upgrade               | —            |
| ExtremeSwitching X620 series    | Standard     | Upgrade               | —            |
| Summit X450-G2 series           | Standard     | Upgrade               | Upgrade      |
| Summit X460-G2 series           | —            | Standard              | Upgrade      |
| Summit X670-G2 series           | —            | Standard              | Upgrade      |
| ExtremeSwitching X870           | —            | Standard              | Upgrade      |
| ExtremeSwitching X690           | —            | Standard              | Upgrade      |

Software keys are stored in the EEPROM and, once enabled, persist through reboots, software upgrades, power outages, and reconfigurations. The keys are unique to the switch and are not transferable.

If you attempt to execute a command and you either do not have the required license or have reached the limits defined by the current license level, the system returns one of the following messages:

```
Error: This command cannot be executed at the current license level.
```

```
Error: You have reached the maximum limit for this feature at this license level.
```

## Displaying the Installed Licenses and Feature Packs

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You can display the types of licenses and feature packs installed on your Extreme Networks switch by using the `show licenses` command.

## Trial Licenses

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You can obtain a trial license, which allows you to use the license for 30 days, and you can downgrade trial licenses to a lower software license level during the trial period. You can extend the time of the trial by 30 days two times (for a total of 90 days). Most feature packs are enabled. After you enable the trial license, the switch behaves as if all software license levels and feature packs are enabled. The trial license key contains all the necessary information on the license level and the number of days. Trial licenses can be applied only once for each software version; if you upgrade to a different software version, you can reapply your trial license. It is not recommended to use a trial license in production.



### Note

The Network Timing feature pack is not included in the trial license.

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To enable a trial license, execute `debug epm enable trial-license`.

To clear a trial license, execute `debug epm clear trial-license`. A reboot is required before the clear license takes effect.



### Note

Enabling a newly obtained license requires clearing the trial license, and then rebooting the switch.

---



# 2 Switch License Features

Edge License Features  
Advanced Edge License Features  
Core License Features

## Edge License Features

The Edge License includes both L2 switching and L3 routing features. The following table lists the features included in the Edge License. Edge license features



### Note

Listed platforms that do not support this license support these features with a higher license level.

**Table 4: ExtremeXOS Edge License Features**

| ExtremeXOS Software Feature                                   | Supported Platforms                   |
|---|---------------------------------------|
| Fabric Attach   | All platforms                         |
| Extended Edge Switching                                       | Summit X670-G2, ExtremeSwitching X690 |
| EDP   | All platforms.                        |
| Extreme Network Virtualization (XNV)                          | All platforms.                        |
| Identity Management   | All platforms.                        |
| LLDP 802.1ab  | All platforms.                        |
| LLDP-MED extensions   | All platforms.                        |
| VLANs—Port based and tagged trunks                            | All platforms.                        |
| VLANs—MAC based   | All platforms.                        |
| VLANs—Protocol based  | All platforms.                        |
| VLANs—Private VLANs   | All platforms.                        |
| VLANs—VLAN translation  | All platforms.                        |
| VMANs—Q-in-Q tunneling (IEEE 802.1ad VMAN tunneling standard) | All platforms.                        |
| VMANs—Egress queue selection based on 802.1p value in S-tag   | All platforms.                        |
| VMANs—Egress queue selection based on 802.1p value in C-tag   | All platforms.                        |
| VMANs—Secondary ethertype support                             | All platforms.                        |
| VMAN Customer Edge Port (CEP—also known as Selective Q-in-Q)  | All platforms.                        |

**Table 4: ExtremeXOS Edge License Features (continued)**

| ExtremeXOS Software Feature  | Supported Platforms |
|--|---------------------|
| VMAN Customer Edge Port CVID Egress Filtering / CVID Translation   | All platforms.      |
| VMAN—CNP port  | All platforms.      |
| VMAN—CNP port, double tag support  | All platforms.      |
| VMAN—CNP port, double tag with egress filtering  | All platforms.      |
| L2 Ping / Traceroute 802.1ag   | All platforms.      |
| Jumbo frames (including all related items, MTU disc. IP frag.)   | All platforms.      |
| QoS—egress port rate shaping/limiting  | All platforms.      |
| QoS—egress queue rate shaping/limiting   | All platforms.      |
| Link Aggregation Groups (LAG), static 802.3ad  | All platforms.      |
| LAG dynamic (802.3ad LACP) edge, to servers only!  | All platforms.      |
| LAG (802.3ad LACP) core, between switches  | All platforms.      |
| Port loopback detection and shutdown (ELRP CLI)  | All platforms.      |
| Software redundant port  | All platforms.      |
| STP 802.1D   | All platforms.      |
| STP EMISTP + PVST+ Compatibility mode (1 domain per port)  | All platforms.      |
| STP EMISTP, PVST+ Full (multi-domain support)  | All platforms.      |
| STP 802.1s   | All platforms.      |
| STP 802.1w   | All platforms.      |
| ERPS (4 max rings with matching ring ports)  | All platforms.      |
| ESRP aware   | All platforms.      |
| EAPS edge (4 max domains with matching ring ports)<br><b>Note:</b> You can increase the number of domains by upgrading to the Advanced Edge license (see <a href="#">Advanced Edge License Features</a> on page 14). | All platforms.      |
| Link Fault Signaling (LFS)   | All platforms.      |
| ELSM (Extreme Link Status Monitoring)  | All platforms.      |
| ACLs, applied on ingress ports <ul style="list-style-type: none"> <li>• IPv4</li> <li>• Static</li> </ul>  | All platforms.      |
| ACLs, applied on ingress ports <ul style="list-style-type: none"> <li>• IPv6</li> <li>• Dynamic</li> </ul>   | All platforms.      |
| ACLs, applied on egress ports  | All platforms.      |
| ACLs, ingress meters   | All platforms.      |

**Table 4: ExtremeXOS Edge License Features (continued)**

| ExtremeXOS Software Feature   | Supported Platforms |
|---|---------------------|
| ACLs, egress meters   | All platforms.      |
| ACLs <ul style="list-style-type: none"> <li>Layer-2 protocol tunneling</li> <li>Byte counters</li> </ul>  | All platforms.      |
| Convergence End Point (CEP) detection   | All platforms.      |
| CPU DoS protect   | All platforms.      |
| CPU Monitoring  | All platforms.      |
| Direct Attach—based on the IEEE version of VEPA, eliminates the virtual switch layer, simplifying the network and improving performance. Direct Attach enables data center simplification by reducing network tiers from four or five tiers to just two or three tiers, depending on the size of the data center. | All platforms.      |
| SNMPv3  | All platforms.      |
| SSH2 server   | All platforms.      |
| SSH2 client   | All platforms.      |
| SCP/SFTP client   | All platforms.      |
| SCP/SFTP server   | All platforms.      |
| RADIUS and TACACS+ per command authentication   | All platforms.      |
| Network login <ul style="list-style-type: none"> <li>Web based method</li> <li>802.1X method</li> <li>MAC-based method</li> <li>Local database for MAC/web-based methods</li> <li>Integration with Microsoft NAP</li> <li>Multiple supplicants - same VLAN</li> <li>HTTPS/SSL for web-based method</li> </ul>     | All platforms.      |
| Network login—Multiple supplicants - multiple VLANs   | All platforms.      |
| Trusted OUI   | All platforms.      |
| MAC security <ul style="list-style-type: none"> <li>Lockdown</li> <li>Limit</li> </ul>  | All platforms.      |
| IP security—DHCP Option 82—L2 mode  | All platforms.      |
| IP security—DHCP Option 82—L2 mode VLAN ID  | All platforms.      |
| IP security—DHCP IP lockdown  | All platforms.      |
| IP security—Trusted DHCP server ports   | All platforms.      |
| Static IGMP membership, IGMP filters  | All platforms.      |
| IPv4 unicast L2 switching   | All platforms.      |
| IPv4 multicast L2 switching   | All platforms.      |

**Table 4: ExtremeXOS Edge License Features (continued)**

| ExtremeXOS Software Feature   | Supported Platforms |
|---|---------------------|
| IPv4 directed broadcast   | All platforms.      |
| IPv4 <ul style="list-style-type: none"> <li>Fast-direct broadcast</li> <li>Ignore broadcast</li> </ul>  | All platforms.      |
| IPv6 unicast L2 switching   | All platforms.      |
| IPv6 multicast L2 switching   | All platforms.      |
| IPv6 netTools—Ping, traceroute, BOOTP relay, DHCP, DNS, and SNTP.   | All platforms.      |
| IPv4 netTools—Ping, traceroute, BOOTP relay, DHCP, DNS, NTP, and SNTP.  | All platforms.      |
| IGMP v1/v2 snooping   | All platforms.      |
| IGMP v3 snooping  | All platforms.      |
| Multicast VLAN Registration (MVR)   | All platforms.      |
| Static MLD membership, MLD filters  | All platforms.      |
| MLD v1 snooping   | All platforms.      |
| MLD v2 snooping   | All platforms.      |
| sFlow accounting  | All platforms.      |
| CLI scripting   | All platforms.      |
| Web-based device management   | All platforms.      |
| Web based management—HTTPS/SSL support  | All platforms.      |
| XML APIs (for partner integration)  | All platforms.      |
| MIBs - Entity, for inventory  | All platforms.      |
| Connectivity Fault Management (CFM)   | All platforms.      |
| Remote mirroring  | All platforms.      |
| Egress mirroring  | All platforms.      |
| Y.1731 compliant frame delay and delay variance measurement   | All platforms.      |
| MVRP - VLAN Topology Management   | All platforms.      |
| EFM OAM - Unidirectional Link Fault Management  | All platforms.      |
| CLEARFlow   | All platforms.      |
| System virtual routers (VRs)  | All platforms.      |
| DHCPv4: <ul style="list-style-type: none"> <li>DHCPv4 server</li> <li>DHCv4 client</li> <li>DHCPv4 relay</li> <li>DHCPv4 smart relay</li> </ul> | All platforms.      |

**Table 4: ExtremeXOS Edge License Features (continued)**

| ExtremeXOS Software Feature   | Supported Platforms   |
|---|---|
| DHCPv6: <ul style="list-style-type: none"> <li>DHCPv6 relay</li> <li>DHCPv6 prefix delegation snooping</li> <li>DHCPv6 client</li> <li>DHCPv6 smart relay</li> <li>DHCPv6 remote ID</li> </ul>  | All platforms.  |
| User-created virtual routers (VRs)<br>Virtual router and forwarding (VRF)   | Summit X450-G2, X460-G2, X670-G2, and ExtremeSwitching X870, X690 |
| Local-only, user-created virtual routers (VR).  | ExtremeSwitching X440-G2, X620                                    |
| VLAN aggregation  | All platforms.  |
| Multinetting for forwarding   | All platforms.  |
| UDP Forwarding  | All platforms.  |
| UDP BootP relay forwarding  | All platforms.  |
| IPv4 unicast routing, including static routes   | All platforms.  |
| IPv4 multicast routing, including static routes<br><br><b>Note:</b> This feature has limitations in the Edge and Advanced Edge licenses. See the <a href="#">ExtremeXOS 30.1 User Guide</a> .   | All platforms.  |
| IPv4 Duplicate Address Detection (DAD)  | All platforms.  |
| IPv6 unicast routing, including static routes   | All platforms.  |
| IPv6 interworking—IPv6-to-IPv4 and IPv6-in-IPv4 configured tunnels  | All platforms, except X620 and X440-G2.                           |
| IPv6 Duplicate Address Detection (DAD) without CLI management   | All platforms.  |
| IPv6 Duplicate Address Detection (DAD) with CLI management  | All platforms.  |
| IP security: <ul style="list-style-type: none"> <li>DHCP Option 82—L3 mode</li> <li>DHCP Option 82—L3 mode VLAN ID</li> <li>Disable ARP learning</li> <li>Gratuitous ARP protection</li> <li>DHCP secured ARP / ARP validation</li> <li>Source IP lockdown</li> </ul> | All platforms.  |
| IP address security: <ul style="list-style-type: none"> <li>DHCP snooping</li> <li>Trusted DHCP server</li> <li>Source IP lockdown</li> <li>ARP validation</li> </ul>   | All platforms.  |
| IP Flow Information Export (IPFIX)  | Summit X460-G2.   |
| Multi-Switch Link Aggregation Group (MLAG)  | All platforms.  |

**Table 4: ExtremeXOS Edge License Features (continued)**

| ExtremeXOS Software Feature  | Supported Platforms   |
|--|---|
| ONEPolicy  | All platforms.  |
| Policy based routing (PBR) for IPv4  | All platforms.  |
| Policy based routing (PBR) for IPv6  | All platforms.  |
| PIM snooping<br><b>Note:</b> This feature has limitations in the Edge and Advanced Edge licenses. See the <a href="#">ExtremeXOS 30.1 User Guide</a> . | All platforms.  |
| Protocol-based VLANs   | All platforms.  |
| RIP v1/v2  | All platforms.  |
| RIPng  | All platforms.  |
| Routing access policies  | All platforms.  |
| Route maps   | All platforms.  |
| Universal Port—VoIP auto configuration   | All platforms.  |
| Universal Port—Dynamic user-based security policies  | All platforms.  |
| Universal Port—Time-of-day policies  | All platforms.  |
| SummitStack (switch stacking using native or dedicated ports)  | Summit X460-G2 with X460-G2-VIM-2SS optional card, and X450-G2.   |
| SummitStack-V (switch stacking using dual purpose data ports)  | All platforms. See the specific models listed in the "Support for Alternate Stacking Ports" section of the <a href="#">ExtremeXOS 30.1 User Guide</a> . |
| SyncE  | Summit X460-G2.   |
| Python scripting   | All platforms.  |

## Advanced Edge License Features

The Advanced Edge License includes all Edge License features and the features in the following table.

**Table 5: ExtremeXOS Advanced Edge License Features**

| ExtremeXOS Software Feature  | Supported Platforms                         |
|--|---|
| BGP Auto-peering   | Summit X670-G2, ExtremeSwitching X690, X870 |
| EAPS Advanced Edge—multiple physical rings, and "common links", also known as "shared port". | All platforms.                              |
| ERPS-more domains (allows 32 rings with matching ring ports) and multi-ring support          | All platforms.                              |
| ESRP-Full  | All platforms.                              |
| ESRP-Virtual MAC   | All platforms.                              |

**Table 5: ExtremeXOS Advanced Edge License Features (continued)**

| ExtremeXOS Software Feature                         | Supported Platforms  |
|---|--|
| OSPFv2-Edge (limited to max of 4 active interfaces) | All platforms that support the Advanced Edge or Core licenses (see <a href="#">Table 3</a> on page 7). |
| OSPFv3-Edge (limited to max of 4 active interfaces) | All platforms that support the Advanced Edge or Core licenses (see <a href="#">Table 3</a> on page 7). |
| PIM-SM-Edge (limited to max of 4 active interfaces) | All platforms that support the Advanced Edge or Core licenses (see <a href="#">Table 3</a> on page 7). |
| VRRP  | All platforms that support the Advanced Edge or Core licenses (see <a href="#">Table 3</a> on page 7). |
| VXLAN   | Summit X670-G2, and ExtremeSwitching X870, X690.   |
| OVSDB   | Summit X670-G2, and ExtremeSwitching X870, X690.   |
| PSTag   | Summit X460-G2, X670-G2, and ExtremeSwitching X870, X690 series switches.                              |

## Core License Features

The Core License includes all Edge License features, Advanced Edge License features, and the features in the following table.

**Table 6: ExtremeXOS Core License Features**

| ExtremeXOS Software Feature                        | Supported Platforms  |
|--|--|
| PIM DM "Full"                                      | Core license platforms listed in <a href="#">Table 3</a> on page 7 |
| PIM SM "Full"                                      | Core license platforms listed in <a href="#">Table 3</a> on page 7 |
| PIM SSM "Full"                                     | Core license platforms listed in <a href="#">Table 3</a> on page 7 |
| OSPFv2 "Full" (not limited to 4 active interfaces) | Core license platforms listed in <a href="#">Table 3</a> on page 7 |
| OSPFv3 "Full" (not limited to 4 active interfaces) | Core license platforms listed in <a href="#">Table 3</a> on page 7 |
| BGP4 and MBGP (BGP4+) for IPv4 ECMP                | Core license platforms listed in <a href="#">Table 3</a> on page 7 |
| BGP4 and MBGP (BGP4+) for IPv6                     | Core license platforms listed in <a href="#">Table 3</a> on page 7 |
| IS-IS for IPv4                                     | Core license platforms listed in <a href="#">Table 3</a> on page 7 |
| IS-IS for IPv6                                     | Core license platforms listed in <a href="#">Table 3</a> on page 7 |
| MSDP   | Core license platforms listed in <a href="#">Table 3</a> on page 7 |
| Anycast RP   | Core license platforms listed in <a href="#">Table 3</a> on page 7 |
| GRE tunneling                                      | Core license platforms listed in <a href="#">Table 3</a> on page 7 |

# 3 Feature Pack Features

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MPLS Feature Pack  
Network Timing Feature Pack  
ExtremeSwitching X440-G2 10 Gigabit Port Licensing  
ExtremeSwitching X870-96x-8c Switch Port Speed License  
MAC Security Feature Pack License

The ExtremeXOS software features are listed in the following table are managed as feature packs. Feature packs are distributed in one of the following forms:

- **In ExtremeXOS software** (standard software component)—You must purchase a license to use the feature pack.
- **Modular software package** (xmod file, due to .xmod filename extension)—You must request the xmod file from your supplier and install it.

For feature pack license and installation instructions, see *Installing a Modular Software Package* in the [ExtremeXOS 30.1 User Guide](#).



**Table 7: ExtremeXOS Feature Pack Features**

| Feature Pack   | Feature  | Platform Support  | XMOD Required |
|--|--|---|---------------|
| MPLS Feature Pack<br>See <a href="#">MPLS Feature Pack</a> on page 19.   | <ul style="list-style-type: none"> <li>• MPLS</li> <li>• LDP</li> <li>• Static LSPs</li> <li>• OSPF-TE</li> <li>• MPLS label</li> <li>• EXP bit replacement and classification</li> <li>• RSVP-TE</li> <li>• VPLS / H-VPLS for VLANs</li> <li>• VPLS STP redundancy</li> <li>• VPLS with ESRP redundancy</li> <li>• VPLS with EAPS redundancy</li> <li>• Fast Reroute (FRR)</li> <li>• Support for PW counters</li> <li>• User Virtual Routers</li> <li>• L3VPN</li> </ul> | Summit X460-G2 (with Advanced Edge license or higher), X670-G2, ExtremeSwitching X870, X690 | No            |
| Network Timing Feature Pack<br>See <a href="#">Network Timing Feature Pack</a> on page 19.   | Precision Time Protocol (PTPv2)  | Summit X460-G2, X670-G2 switches.   | No            |
| AVB Feature Pack   | <ul style="list-style-type: none"> <li>• Generalized Precision Time Protocol (GPTP)</li> <li>• Multiple VLAN Registration Protocol (MVRP)</li> <li>• Multiple Stream Registration Protocol (MSRP)</li> <li>• Platform Support</li> </ul>   | All platforms, except the ExtremeSwitching X870 and X690.                                   | No            |
| OpenFlow Feature Pack  | OpenFlow   | All platforms.  | No            |
| ExtremeSwitching X440-G2 10 Gigabit Port Licensing<br>See <a href="#">ExtremeSwitching X440-G2 10 Gigabit Port Licensing</a> on page 19. | 10 Gigabit Port Licensing  | ExtremeSwitching X440-G2  | No            |

**Table 7: ExtremeXOS Feature Pack Features (continued)**

| Feature Pack   | Feature                       | Platform Support   | XMOD Required |       |                              |  |                               |    |                            |     |  |                  |     |    |
|--|-------------------------------|--|---------------|-------|------------------------------|--|-------------------------------|----|----------------------------|-----|--|------------------|-----|----|
| ExtremeSwitching X870-96x-8c Switch Port Speed License<br>See <a href="#">ExtremeSwitching X870-96x-8c Switch Port Speed License</a> on page 20. | 100 Gigabit Port Licensing    | ExtremeSwitching X870-96x-8c   | No            |       |                              |  |                               |    |                            |     |  |                  |     |    |
| MAC Security License<br>See <a href="#">MAC Security Feature Pack License</a> on page 21.  | MAC Security licensing.       | <p><b>Table 7: ExtremeXOS Feature Pack Features</b></p> <table border="1"> <thead> <tr> <th>Platform</th> <th>Ports</th> <th>LRM/MACsec Adapter Required?</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Summit X460-G2-24p-24hp, X460-G2-24t-24ht switches</td> <td>Half-duplex, 1G ports (25-48)</td> <td>No</td> </tr> <tr> <td>All other SFP/SFP+ ports *</td> <td>Yes</td> </tr> <tr> <td>Summit X450-G2, X460-G2, X670-G2, and ExtremeSwitching X440-G2, X620, and X690 series switches</td> <td>SFP/SFP+ ports *</td> <td>Yes</td> </tr> </tbody> </table> <p><b>Note:</b> * For Summit X460-G2 series switches, the VIM-2X option does not support the LRM/MACsec Adapter.</p> | Platform      | Ports | LRM/MACsec Adapter Required? | Summit X460-G2-24p-24hp, X460-G2-24t-24ht switches | Half-duplex, 1G ports (25-48) | No | All other SFP/SFP+ ports * | Yes | Summit X450-G2, X460-G2, X670-G2, and ExtremeSwitching X440-G2, X620, and X690 series switches | SFP/SFP+ ports * | Yes | No |
| Platform   | Ports                         | LRM/MACsec Adapter Required?   |               |       |                              |  |                               |    |                            |     |  |                  |     |    |
| Summit X460-G2-24p-24hp, X460-G2-24t-24ht switches   | Half-duplex, 1G ports (25-48) | No   |               |       |                              |  |                               |    |                            |     |  |                  |     |    |
|  | All other SFP/SFP+ ports *    | Yes  |               |       |                              |  |                               |    |                            |     |  |                  |     |    |
| Summit X450-G2, X460-G2, X670-G2, and ExtremeSwitching X440-G2, X620, and X690 series switches   | SFP/SFP+ ports *              | Yes  |               |       |                              |  |                               |    |                            |     |  |                  |     |    |

**Note**



Starting with ExtremeXOS 21.1, Secure Shell 2 (SSH2) is no longer provided as a feature pack. It is incorporated into the main ExtremeXOS software image and is no longer provided as an XMOD. However, SSH2 contains strong encryption algorithms that heighten the export controls required in the US and other countries. When downloading the ExtremeXOS software image, you are required to verify that you meet the export clearance requirements. For more information, see *Software Upgrade and Boot Options* in the [ExtremeXOS 30.1 User Guide](#). For more information on SSH2, see *Using Secure Shell 2* in the [ExtremeXOS 30.1 User Guide](#).

## MPLS Feature Pack

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MPLS support, including VPLS L2 VPNs and L3 VPNs, can be obtained from Extreme Networks at an additional cost, as a feature pack.

A separate feature pack must be purchased for each switch that runs MPLS and VPLS.

MPLS requires an Advanced Edge or Core software license.

After you enable the feature pack, the feature CLI commands are visible; without an enabled MPLS feature pack, you do not see any feature commands on the console.

## Network Timing Feature Pack

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The Network Timing Feature Pack supports the Precision Time Protocol (PTPv2).

This feature pack is included with all ExtremeXOS software licenses and can be enabled by purchasing and enabling a feature pack license key.



### Note

Network-Clock module is required in addition to Network Timing Feature Pack to enable PTPv2 in ExtremeXOS.

For more information about PTPv2, see *Overview of PTP* in the [ExtremeXOS 30.1 User Guide](#).

## ExtremeSwitching X440-G2 10 Gigabit Port Licensing

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ExtremeSwitching X440-G2 10 Gigabit model switches require a license to upgrade the four SFP+ 1GbE ports to 10G:

- Dual 10GbE Upgrade License—enables 10G Ethernet on the non-stack capable ports
- Quad 10GbE Upgrade License—enables 10G Ethernet on all four uplink ports
- Dual to Quad 10 GbE Upgrade License—enables two more (total of four) 10G Ethernet on the uplink ports



### Note

SFP+ ports that can be used as stack ports after enabling stacking-support do not require a license to operate as stack ports.

The following table summarizes the specific ports licensed with each license type along with the ports that can be used as stack ports without any license.

**Table 8: ExtremeSwitching X440-G2 10G Port Licensing**

| Model   | Dual License | Quad License | Convert to Stack Port (No License Required) |
|---|--------------|--------------|---|
| X440-G2-48t-10GE4<br>X440-G2-48p-10GE4<br>X440-G2-48t-10GE4-DC                      | 51-52        | 49-52        | 49-50                                       |
| X440-G2-24t-10GE4<br>X440-G2-24p-10GE4<br>X440-G2-24t-10GE4-DC<br>X440-G2-24x-10GE4 | 25-26        | 25-28        | 27-28                                       |
| X440-G2-12t-10GE4<br>X440-G2-12p-10GE4  | 13-14        | 13-16        | 15-16                                       |

These licenses take effect immediately after successful installation. No reboot is required to activate the installed license. Following successful installation of the license, 10G speed is supported on these ports. Ports with 10G optics installed are re-enabled at 10G speed and ports without optics are defaulted to 10G speed.

Without a license installed, these ports are set at 1G, autonegotiation enabled, and cannot be configured for 10G.

In a stack, a 10G upgrade license must be applied to each node in the stack for which 10G capability is required on the individual node's non-stack 10G ports. There is no requirement to match or install any 10G licenses on master-capable nodes.

For example, consider a stack of three nodes, all 10G-capable X440-G2 models with slot-1 as master, slot-2 as backup, and slot-3 as standby, and not master-capable. In this stack, you only require the 10G capability on the standby slot-3, non-stack 10G ports. In this case, a Dual 10G upgrade license should be installed on slot-3. Slots 1 and 2 do not require any license. Note also that a Quad 10G license can be used in this configuration, but adds no extra capability since the two stacking capable 10G ports are used as stack ports.

## ExtremeSwitching X870-96x-8c Switch Port Speed License

This license increases the rate from 10G to 100G on QSFP28+ ports 1 through 24 on ExtremeSwitching X870-96x-8c switches.

Each license enables a group of six ports. You can purchase a total of four licenses per switch, which enables the first 24 QSFP28+ ports to operate in the following partition modes: 4x10G, 4x25G, 2x50G, 1x40G and 1x100G. Each license enables the highest numbered six-port group that is not already activated (first 19-24, then 13-18, then 7-12, and finally 1-6).



### Note

The first 24 unlicensed ports are 4x10G by default.



### Note

A switch reboot is not required when a license is successfully installed.

A port speed license cannot be downgraded. However, you can disable the license by clearing all of the installed port speed licenses.

## MAC Security Feature Pack License

Use of the MAC Security (MACsec) feature requires a slot-based MACsec Feature Pack license.

Slot-based MACsec licenses have the following behaviors (see [Table 9](#)).

**Table 9: MACsec License Behavior**

|                   | No License  | License Installed   |
|-------------------|---|---|
| Standalone Switch | <ul style="list-style-type: none"> <li>The command <code>show macsec</code> is the only available command.</li> <li>MACsec cannot be configured or enabled.</li> </ul>                            | <ul style="list-style-type: none"> <li>All MACsec commands are available.</li> <li>MACsec can be configured and enabled.</li> </ul>                   |
| Stack             | <ul style="list-style-type: none"> <li>All MACsec commands are available.</li> <li>MACsec can be configured on MACsec-capable slots.</li> <li>If configured, MACsec cannot be enabled.</li> </ul> | <ul style="list-style-type: none"> <li>All MACsec commands are available.</li> <li>MACsec can be configured and enabled on licensed slots.</li> </ul> |

### Note



In a stack, any slot configured with a MACsec-capable module (with `configure slot slot module module_type`) can be configured for MACsec, even if the slot is not physically present, or if the slot is present, but does not have a valid MACsec license installed.