



ExtremeXOS[®] Feature License Requirements

for Version 30.6

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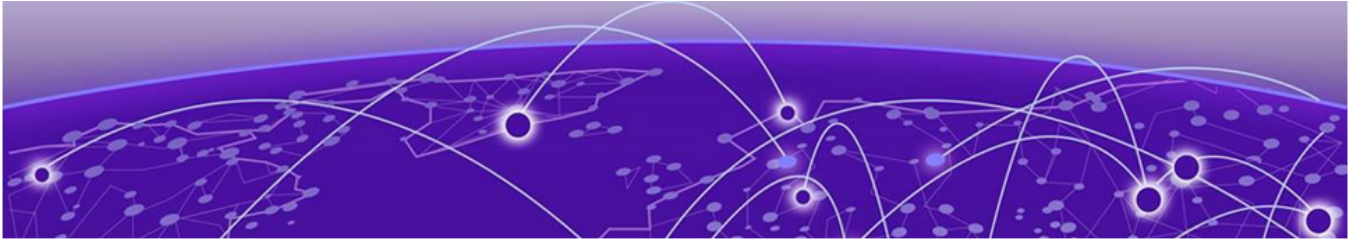


Table of Contents

| | |
|---|-----------|
| Preface..... | 4 |
| Text Conventions..... | 4 |
| Related Publications..... | 6 |
| ExtremeXOS Publications..... | 6 |
| Extreme Management Center Publications..... | 6 |
| Open Source Declarations..... | 6 |
| Providing Feedback..... | 6 |
| Getting Help..... | 7 |
| Subscribe to Service Notifications..... | 7 |
| Overview..... | 8 |
| Displaying the Installed Licenses and Feature Packs..... | 9 |
| Trial Licenses..... | 9 |
| Switch License Features..... | 10 |
| Value Edge License Features..... | 10 |
| Edge License Features..... | 14 |
| Advanced Edge License Features..... | 16 |
| Core License Features..... | 17 |
| Feature Pack Features..... | 18 |
| MACsec Platform Support..... | 18 |
| MPLS Feature Pack..... | 21 |
| Network Timing Feature Pack..... | 21 |
| ExtremeSwitching X440-G2 10 Gigabit Port Licensing..... | 22 |
| ExtremeSwitching X870-96x-8c Switch Port Speed License..... | 23 |
| MAC Security Feature Pack License..... | 23 |
| Optics XMOD..... | 24 |
| Limitations..... | 24 |



Preface

This section describes the text conventions used in this document, where you can find additional information, and how you can provide feedback to us.

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. |

Table 1: Notes and warnings (continued)



| Icon | Notice type | Alerts you to... |
|---|-------------|--|
|  | Caution | Risk of personal injury, system damage, or loss of data. |
|  | Warning | Risk of severe personal injury. |

Table 2: Text

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

Table 3: Command syntax

| Convention | Description |
|------------------------------------|--|
| bold text | Bold text indicates command names, keywords, and command options. |
| <i>italic</i> text | Italic text indicates variable content. |
| [] | Syntax components displayed within square brackets are optional. Default responses to system prompts are enclosed in square brackets. |
| { x y z } | A choice of required parameters is enclosed in curly brackets separated by vertical bars. You must select one of the options. |
| x y | 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. |

Related Publications

ExtremeXOS Publications

- [ACL Solutions Guide](#)
- [ExtremeXOS 30.6 Command Reference Guide](#)
- [ExtremeXOS 30.6 EMS Messages Catalog](#)
- [ExtremeXOS 30.6 Feature License Requirements](#)
- [ExtremeXOS 30.6 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](#)

Extreme Management Center Publications

- [ISW-Series Managed Industrial Ethernet Switch Extreme Management Center User Guide](#)

Open Source Declarations

Some software files have been licensed under certain open source licenses. More information is available at: www.extremenetworks.com/support/policies/open-source-declaration/.

Providing Feedback

The Information Development team at Extreme Networks has 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 we especially want to know about:

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

If you would like to provide feedback, you can do so in three ways:

- In a web browser, select the feedback icon and complete the online feedback form.
- Access the feedback form at <https://www.extremenetworks.com/documentation-feedback/>.
- Email us at 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.

Getting Help

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

Extreme Portal

Search the GTAC (Global Technical Assistance Center) knowledge base; manage support cases and service contracts; download software; and obtain product licensing, training, and certifications.

The Hub

A forum for Extreme Networks customers to connect with one another, answer questions, and share ideas and feedback. This community is monitored by Extreme Networks employees, but is not intended to replace specific guidance from GTAC.

Call GTAC

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

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

- Your Extreme Networks service contract number, 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 Service Notifications

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

1. Go to www.extremenetworks.com/support/service-notification-form.
2. Complete the form (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. Select **Submit**.



Overview

Displaying the Installed Licenses and Feature Packs on page 9 Trial Licenses on page 9

This document introduces the licenses and feature packs available for the ExtremeXOS® 30.6 software and lists the features they support.

The ExtremeXOS software supports the following license options:

- Value Edge
- Edge
- Advanced Edge
- Core
- Feature Packs

The Value 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 Advance 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 4: Standard and Upgrade Licenses for ExtremeSwitching Switches

| Switch platform | Value Edge | Edge | Advanced Edge | Core |
|--------------------------|------------|----------|---------------|---------|
| ExtremeSwitching X435 | Standard | — | — | — |
| ExtremeSwitching X440-G2 | — | Standard | Upgrade | — |
| ExtremeSwitching X620 | — | Standard | Upgrade | — |
| ExtremeSwitching X450-G2 | — | Standard | Upgrade | Upgrade |
| ExtremeSwitching X460-G2 | — | — | Standard | Upgrade |
| ExtremeSwitching X465 | — | — | Standard | Upgrade |
| ExtremeSwitching X670-G2 | — | — | Standard | Upgrade |

Table 4: Standard and Upgrade Licenses for ExtremeSwitching Switches (continued)

| Switch platform | Value Edge | Edge | Advanced Edge | Core |
|-----------------------|------------|------|---------------|---------|
| ExtremeSwitching X870 | — | — | Standard | Upgrade |
| ExtremeSwitching X690 | — | — | Standard | Upgrade |
| ExtremeSwitching X590 | — | — | Standard | Upgrade |
| ExtremeSwitching X695 | — | — | 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

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

Trial Licenses

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.

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.



Switch License Features

[Value Edge License Features](#) on page 10

[Edge License Features](#) on page 14

[Advanced Edge License Features](#) on page 16

[Core License Features](#) on page 17

Value Edge License Features

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



Note

Listed platforms that do not support the Value Edge license do support these features with a higher license level.

Table 5: ExtremeXOS Value Edge License Features

| ExtremeXOS software feature | Supported platforms |
|---|---------------------|
| EDP | All platforms |
| Fabric Attach | 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 |

Table 5: ExtremeXOS Value Edge License Features (continued)

| ExtremeXOS software feature | Supported platforms |
|--|---------------------|
| VMAN Customer Edge Port (CEP—also known as Selective Q-in-Q) | All 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) Note: You can increase the number of domains by upgrading to the Advanced Edge license (see Advanced Edge License Features on page 16). | 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"> • IPv4 • Static | All platforms |

Table 5: ExtremeXOS Value Edge License Features (continued)

| ExtremeXOS software feature | Supported platforms |
|---|---------------------|
| ACLs, applied on ingress ports <ul style="list-style-type: none"> IPv6 Dynamic | All platforms |
| ACLs, applied on egress ports | All platforms |
| ACLs, ingress meters | All platforms |
| ACLs, egress meters | All platforms |
| ACLs <ul style="list-style-type: none"> Layer-2 protocol tunneling Byte counters | All platforms |
| CPU DoS protect | All platforms |
| CPU Monitoring | 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"> Web-based method 802.1X method MAC-based method Local database for MAC/web-based methods Integration with Microsoft NAP Multiple supplicants - same VLAN HTTPS/SSL for web-based method | All platforms |
| Network Login—Multiple supplicants - multiple VLANs | All platforms |
| Trusted OUI | All platforms |
| MAC security <ul style="list-style-type: none"> Lockdown Limit | 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 |

Table 5: ExtremeXOS Value Edge License Features (continued)

| ExtremeXOS software feature | Supported platforms |
|--|---------------------|
| IPv4 multicast L2 switching | All platforms |
| IPv4 directed broadcast | All platforms |
| IPv4 <ul style="list-style-type: none"> • Fast-direct broadcast • Ignore broadcast | 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 |
| Universal Port—VoIP auto configuration | All platforms |
| Universal Port—Dynamic user-based security policies | All platforms |
| Universal Port—Time-of-day policies | All platforms |

Edge License Features

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

Table 6: ExtremeXOS Edge License Features

| ExtremeXOS software feature | Supported platforms |
|---|--|
| Extended Edge Switching | ExtremeSwitching X670-G2, X465, X590, X690 |
| Convergence End Point (CEP) detection | 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 |
| CLEARFlow | All platforms |
| System virtual routers (VRs) | All platforms |
| DHCPv4: <ul style="list-style-type: none"> • DHCPv4 server • DHCv4 client • DHCPv4 relay • DHCPv4 smart relay | All platforms |
| DHCPv6: <ul style="list-style-type: none"> • DHCPv6 relay • DHCPv6 prefix delegation snooping • DHCPv6 client • DHCPv6 smart relay • DHCPv6 remote ID | All platforms |
| User-created virtual routers (VRs) Virtual router and forwarding (VRF) | ExtremeSwitching X450-G2, X460-G2, X670-G2, X465, X870, X690, X590, X695 |
| Local-only, user-created virtual routers (VR) | ExtremeSwitching X435, 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 Note: This feature has limitations in the Edge and Advanced Edge licenses. See the ExtremeXOS 30.6 User Guide . | All platforms |
| IPv4 Duplicate Address Detection (DAD) | All platforms |
| IPv6 unicast routing, including static routes | All platforms |

Table 6: ExtremeXOS Edge License Features (continued)

| ExtremeXOS software feature | Supported platforms |
|---|--|
| IPv6 interworking—IPv6-to-IPv4 and IPv6-in-IPv4 configured tunnels | All platforms, except X435, X620, and X440-G2 |
| IPv6 DAD without CLI management | All platforms |
| IPv6 DAD with CLI management | All platforms |
| IP security: <ul style="list-style-type: none"> DHCP Option 82—L3 mode DHCP Option 82—L3 mode VLAN ID Disable ARP learning Gratuitous ARP protection DHCP secured ARP / ARP validation Source IP lockdown | All platforms |
| IP address security: <ul style="list-style-type: none"> DHCP snooping Trusted DHCP server Source IP lockdown ARP validation | All platforms |
| IP Flow Information Export (IPFIX) | ExtremeSwitching X460-G2 |
| Multi-Switch Link Aggregation Group (MLAG) | All platforms |
| ONEPolicy | All platforms |
| Policy based routing (PBR) for IPv4 | All platforms |
| Policy based routing (PBR) for IPv6 | All platforms |
| PIM snooping Note: This feature has limitations in the Edge and Advanced Edge licenses. See the ExtremeXOS 30.6 User Guide . | All platforms |
| Protocol-based VLANs | All platforms |
| RIP v1/v2 | All platforms |
| RIPng | All platforms |
| Routing access policies | All platforms |
| Route maps | All platforms |
| SummitStack (switch stacking using native or dedicated ports) | ExtremeSwitching X460-G2 with X460-G2-VIM-2SS optional card, and X450-G2 |
| SummitStack-V (switch stacking using dual-purpose data ports) | All platforms, except X435. See the specific models listed in the "Support for Alternate Stacking Ports" section of the ExtremeXOS 30.6 User Guide . |
| SyncE | ExtremeSwitching X460-G2 |

Table 6: ExtremeXOS Edge License Features (continued)

| ExtremeXOS software feature | Supported platforms |
|--------------------------------------|----------------------------|
| Python scripting | All platforms |
| Extreme Network Virtualization (XNV) | All platforms, except X435 |

Advanced Edge License Features

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

Table 7: ExtremeXOS Advanced Edge License Features

| ExtremeXOS Software Feature | Supported Platforms |
|--|--|
| BGP Auto-peering | ExtremeSwitching X670-G2, X465, X690, X870, X590, X695 |
| 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. |
| OSPFv2-Edge (limited to max of 4 active interfaces) | All platforms that support the Advanced Edge or Core licenses (see Table 4 on page 8). |
| OSPFv2 Auto-peering | ExtremeSwitching X670-G2, X465, X690, X870, X590, X695. |
| OSPFv3-Edge (limited to max of 4 active interfaces) | All platforms that support the Advanced Edge or Core licenses (see Table 4 on page 8). |
| PIM-SM-Edge (limited to max of 4 active interfaces) | All platforms that support the Advanced Edge or Core licenses (see Table 4 on page 8). |
| VRRP | All platforms that support the Advanced Edge or Core licenses (see Table 4 on page 8). |
| VXLAN | ExtremeSwitching X670-G2, X465, X870, X690, X590, X695. |
| PSTag | ExtremeSwitching X460-G2, X670-G2, X465, X870, X690, X590, X695. |

Core License Features

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

Table 8: ExtremeXOS Core License Features

| ExtremeXOS software feature | Supported platforms |
|--|---|
| PIM DM "Full" | Core license platforms listed in Table 4 on page 8 |
| PIM SM "Full" | Core license platforms listed in Table 4 on page 8 |
| PIM SSM "Full" | Core license platforms listed in Table 4 on page 8 |
| OSPFv2 "Full" (not limited to 4 active interfaces) | Core license platforms listed in Table 4 on page 8 |
| OSPFv3 "Full" (not limited to 4 active interfaces) | Core license platforms listed in Table 4 on page 8 |
| BGP4 and MBGP (BGP4+) for IPv4 ECMP | Core license platforms listed in Table 4 on page 8 |
| BGP4 and MBGP (BGP4+) for IPv6 | Core license platforms listed in Table 4 on page 8 |
| IS-IS for IPv4 | Core license platforms listed in Table 4 on page 8 |
| IS-IS for IPv6 | Core license platforms listed in Table 4 on page 8 |
| MSDP | Core license platforms listed in Table 4 on page 8 |
| Anycast RP | Core license platforms listed in Table 4 on page 8 |
| GRE tunneling | Core license platforms listed in Table 4 on page 8 |
| EVPN | ExtremeSwitching X670-G2, X465, X590, X690, X695, X870 series switches |
| Extreme Insight for guest VMs | ExtremeSwitching X465-24MU, X465-2MU-24W, X465i-48W, and X465-24XE switches, X695 |



Feature Pack Features

MPLS Feature Pack on page 21

Network Timing Feature Pack on page 21

ExtremeSwitching X440-G2 10 Gigabit Port Licensing on page 22

ExtremeSwitching X870-96x-8c Switch Port Speed License on page 23

MAC Security Feature Pack License on page 23

Optics XMOD on page 24

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 30.6 User Guide](#).

Table 9: ExtremeXOS Feature Pack Features

| Feature pack | Feature | Platform support | XMOD Required |
|--|--|--|---------------|
| MPLS Feature Pack See MPLS Feature Pack on page 21. | <ul style="list-style-type: none"> • MPLS • LDP • Static LSPs • OSPF-TE • MPLS label • EXP bit replacement and classification • RSVP-TE • VPLS / H-VPLS for VLANs • VPLS STP redundancy • VPLS with ESRP redundancy • VPLS with EAPS redundancy • Fast Reroute (FRR) • Support for PW counters • User Virtual Routers • L3VPN | ExtremeSwitching X460-G2, X670-G2, X465, X590, X870, X690. | No |
| Network Timing Feature Pack See Network Timing Feature Pack on page 21. | Precision Time Protocol (PTPv2) | ExtremeSwitching X460-G2, X670-G2 switches. | No |
| AVB Feature Pack | <ul style="list-style-type: none"> • Generalized Precision Time Protocol (GPTP) • Multiple VLAN Registration Protocol (MVRP) • Multiple Stream Registration Protocol (MSRP) • Platform Support | <p>All platforms, except the ExtremeSwitching X870, X690, X695, X590.</p> <p>Note: The ExtremeSwitching X465 series switch support AVB on the front panel ports only, and all ports on the following VIMs:</p> <ul style="list-style-type: none"> • VIM5-4X • VIM5-2Y • VIM5-4Y • VIM5-2Q | No |

Table 9: ExtremeXOS Feature Pack Features (continued)

| Feature pack | Feature | Platform support | XMOD Required |
|--|--|--|---------------|
| ExtremeSwitching X440-G2 10 Gigabit Port Licensing See ExtremeSwitching X440-G2 10 Gigabit Port Licensing on page 22. | 10 Gigabit Port Licensing | ExtremeSwitching X440-G2. | No |
| ExtremeSwitching X870-96x-8c Switch Port Speed License See ExtremeSwitching X870-96x-8c Switch Port Speed License on page 23. | 100 Gigabit Port Licensing | ExtremeSwitching X870-96x-8c. | No |
| MAC Security License See MAC Security Feature Pack License on page 23. | MAC Security licensing. | See MACsec Platform Support | No |
| Optics See Optics XMOD on page 24. | Optical transceiver support available outside of ExtremeXOS release cycle. | ExtremeSwitching X465, X590, X690, and X870. | Yes |
| ExtremeCloud™ IQ Agent | ExtremeXOS 30.6 provides support for ExtremeCloud IQ with device discovery and basic monitoring. For more information about ExtremeCloud IQ, go to https://www.extremenetworks.com/extremecloud-iq/ . | ExtremeSwitching X435, X440-G2, X450-G2, X460-G2, X465, X695 | Yes |

MACsec Platform Support

| Platform | Ports | LRM/MACsec Adapter Required? |
|---|-------------------------------|------------------------------|
| ExtremeSwitching X460-G2-24p-24hp, X460-G2-24t-24ht switches | Half-duplex, 1G ports (25-48) | No |
| | All other SFP/SFP+ ports * | Yes |
| ExtremeSwitching X450-G2, X460-G2, X670-G2, X440-G2, X590, X620, X690, and X695 series switches | SFP/SFP+ ports * | Yes |

| Platform | Ports | LRM/ MACsec Adapter Required? |
|---|--|--|
| ExtremeSwitching X465 | X465-24W, X465-24XE: ports 1–24 X465-48T, X465-48P, X465-48W, X465i-48W: ports 1–48 X465-24MU-24W: ports 25–48 VIM5-4XE: all 4 ports VIM5-4YE in X465-24MU, X465-24MU-24W switches: all 4 ports VIM5-4YE in X465-24W, X465-48T, X465-48P, X465-48W, X464.24S, X465-24S, X465i-48W: first 2 ports only | No |
| <p>Note: * For ExtremeSwitching X460-G2 series switches, the VIM-2X option does not support the LRM/ MACsec Adapter.</p> | | |



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 30.6 User Guide](#). For more information on SSH2, see *Using Secure Shell 2* in the [ExtremeXOS 30.6 User Guide](#).

MPLS Feature Pack

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

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

This feature pack is included with all ExtremeXOS software 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 30.6 User Guide](#).

ExtremeSwitching X440-G2 10 Gigabit Port Licensing

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 10: ExtremeSwitching X440-G2 10G Port Licensing

| Model | Dual License | Quad License | Convert to Stack Port (No License Required) |
|---|--------------|--------------|---|
| X440-G2-48t-10GE4 X440-G2-48p-10GE4 X440-G2-48t-10GE4-DC | 51-52 | 49-52 | 49-50 |
| X440-G2-24t-10GE4 X440-G2-24p-10GE4 X440-G2-24t-10GE4-DC X440-G2-24x-10GE4 | 25-26 | 25-28 | 27-28 |
| X440-G2-12t-10GE4 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 11](#)).

Table 11: MACsec License Behavior

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



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.

Optics XMOD

The Optics XMOD is a separate software package that can add optical transceiver support between ExtremeXOS releases.

Limitations

The Optics XMOD does not have the capability to communicate directly with the hardware, so not all transceivers can be supported solely through the Optics XMOD. If a new transceiver requires some type of unique initialization that requires direct hardware access, it may require a new ExtremeXOS release.