



ExtremeXOS Feature License Requirements

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Preface

Conventions

This section discusses the conventions used in this guide.

Text Conventions

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

Table 1: Notice Icons





Icon	Notice Type	Alerts you to...
	Note	Important features or instructions.
	Caution	Risk of personal injury, system damage, or loss of data.
	Warning	Risk of severe personal injury.
	New	This command or section is new for this release.

Table 2: Text Conventions

Convention	Description
<code>Screen displays</code>	This typeface indicates command syntax, or represents information as it appears on the screen.
The words enter and type	When you see the word “enter” in this guide, you must type something, and then press the Return or Enter key. Do not press the Return or Enter key when an instruction simply says “type.”
[Key] names	Key names are written with brackets, such as [Return] or [Esc]. If you must press two or more keys simultaneously, the key names are linked with a plus sign (+). Example: Press [Ctrl]+[Alt]+[Del]
<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.

Platform-Dependent Conventions

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

- BlackDiamond® X series switch
- BlackDiamond 8800 series switches

- Cell Site Routers (E4G-200 and E4G-400)
- Summit® family 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. 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.

Terminology

When features, functionality, or operation is specific to a switch family, the family name is used. Explanations about features and operations that are the same across all product families simply refer to the product as the "switch."

Providing Feedback to Us

We are always striving to improve our documentation and help you work better, so we want to hear from you! We welcome all feedback but especially want to know about:

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

If you would like to provide feedback to the Extreme Networks Information Development team about this document, please contact us using our short [online feedback form](#). You can also email us directly at InternalInfoDev@extremenetworks.com.

Getting Help

If you require assistance, contact Extreme Networks Global Technical Assistance Center using one of the following methods:

Web	www.extremenetworks.com/support
Phone	1-800-872-8440 (toll-free in U.S. and Canada) or 1-603-952-5000 For the Extreme Networks support phone number in your country: www.extremenetworks.com/support/contact
Email	support@extremenetworks.com To expedite your message, enter the product name or model number in the subject line.

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

- Your Extreme Networks service contract number
- A description of the failure
- A description of any action(s) already taken to resolve the problem (for example, changing mode switches or rebooting the unit)
- The serial and revision numbers of all involved Extreme Networks products in the network

- A description of your network environment (such as layout, cable type, other relevant environmental information)
- Network load and frame size 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 previous Return Material Authorization (RMA) numbers

Related Publications

ExtremeXOS Publications

- *ACL Solutions Guide*
- *EMS Messages Catalog*
- *ExtremeXOS Command Reference Guide*
- *ExtremeXOS Feature License Requirements*
- *ExtremeXOS User Guide*
- *ExtremeXOS Legacy CLI Quick Reference Guide*
- *ExtremeXOS Release Notes*
- *Hardware/Software Compatibility and Recommendation Matrices*
- *Switch Configuration with Chalet*
- *Using AVB with Extreme Switches*

NetSight Documentation

NetSight documentation, including release notes, are available at: <https://extranet.extremenetworks.com/>. You must have a valid customer account to access this site.

NetSight online Help is available from the **Help** menu in all NetSight software applications. The online help provides detailed explanations of how to configure and manage your network using NetSight software applications.

For complete regulatory compliance and safety information, refer to the document *Intel® Server Products Product Safety and Regulatory Compliance*.

Open Source Declaration

Some ExtremeXOS software files have been licensed under certain open source licenses. Information is available at: www.extremenetworks.com/services/osl-exos.aspx

1 Feature License Requirements

Overview

Switch License Features Feature Pack Features

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

Overview

The ExtremeXOS software supports the following license options:

- L2 Edge
- Edge
- Advanced Edge
- Core
- Feature Packs

The L2 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 L2 Edge and Edge licenses, plus the features in the Advanced Edge license. The Core license includes all of the features in the Advanced Edge license, plus the features in the Core license. See the following table for a list of 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	L2 Edge License	Edge License	Advanced Edge License	Core License
Summit X430	Standard	—	—	—
Summit X440 series	—	Standard	Upgrade	—
Summit X460 series	—	Standard	Upgrade	Upgrade
Summit X460-G2 series	—	Standard	Upgrade	Upgrade
Summit X480 series	—	—	Standard	Upgrade
Summit X670 series	—	—	Standard	Upgrade
Summit X670-G2 series	—	—	Standard	Upgrade
Summit X770 series	—	—	Standard	Upgrade
E4G-200	—	Standard	Upgrade	Upgrade

Table 3: Standard and Upgrade Licenses for ExtremeXOS Switches (continued)

Switch Platform	L2 Edge License	Edge License	Advanced Edge License	Core License
E4G-400	—	—	Standard	Upgrade
BlackDiamond X8 series	—	—	Standard	Upgrade
BlackDiamond 8800 series	—	—	Standard	Upgrade

Software keys are stored in the EEPROM of the chassis and, once enabled, persist through reboots, software upgrades, power outages, and reconfigurations. Because the license is stored in the EEPROM of the chassis (and not on the MSM/MM card), the license persists even if you change MSM/MM cards. The keys are unique to the chassis or 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.
```

You can obtain a trial license, which allows you to use the license for 30, 60, or 90 days, and you can downgrade trial licenses to a lower software license level during the trial period. 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. Once you have a trial license for any one of these periods, you cannot extend the time of the trial. 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.

**Note**

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

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.

Switch License Features

L2 Edge License Features

The L2 Edge license provides all Layer 2 switch applicable capabilities of the ExtremeXOS software that are not licensed by the higher license levels (the Edge, Advanced Edge, and Core licenses) and the Feature Packs.

The following table lists most of the L2 Edge license features.



Note

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

Table 4: ExtremeXOS L2 Edge License Features

ExtremeXOS Software Feature	Supported Platforms
EDP	All platforms
Extreme Network Virtualization (XNV)	All platforms except Summit X430.
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.
VMAN Customer Edge Port CVID Egress Filtering / CVID Translation	All platforms except Summit X430.
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

Table 4: ExtremeXOS L2 Edge License Features (continued)

ExtremeXOS Software Feature	Supported 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)	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
ACLs, applied on ingress ports <ul style="list-style-type: none"> • IPv6 • Dynamic 	All platforms
ACLs, applied on egress ports	All platforms except Summit X430.
ACLs, ingress meters	All platforms
ACLs, egress meters	All platforms except Summit X430.
ACLs <ul style="list-style-type: none"> • Layer-2 protocol tunneling • Byte counters 	All platforms
MSM/MM hitless failover for STP	BlackDiamond 8000 series
MSM hitless failover for ESRP	BlackDiamond 8000 series
MSM/MM hitless failover - Additional capabilities: EAPS, NetLogin, PoE. Graceful Restart for OSPF, BGP	BlackDiamond 8000 series
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

Table 4: ExtremeXOS L2 Edge License Features (continued)

ExtremeXOS Software Feature	Supported 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
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, except Summit X430
IPv6 unicast L2 switching	All platforms
IPv6 multicast L2 switching	All platforms
IPv6 netTools—Ping, traceroute, BOOTP relay, DHCP, DNS, 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

Table 4: ExtremeXOS L2 Edge License Features (continued)

ExtremeXOS Software Feature	Supported 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, except Summit X430
MVRP - VLAN Topology Management	All platforms
EFM OAM - Unidirectional Link Fault Management	All platforms, except Summit X430

Edge License Features

The Edge License adds L3 routing and switching to the list of L2 features supported by the L2 Edge license. 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 5: ExtremeXOS Edge License Features

ExtremeXOS Software Feature	Supported Platforms
CLEARFlow	All platforms that support the Edge, Advanced Edge, and Core licenses
EAPS edge (4 max domains, single physical ring)	All platforms that support the Edge, Advanced Edge, and Core licenses. ¹
System virtual routers (VRs)	All platforms that support the Edge, Advanced Edge, and Core licenses. ¹
User-created Virtual Routers (VRs) Virtual Router and Forwarding (VRF)	All platforms that support the Edge, Advanced Edge, and Core licenses
VLAN aggregation	All platforms that support the Edge, Advanced Edge, and Core licenses. ¹
Multinetting for forwarding	All platforms that support the Edge, Advanced Edge, and Core licenses. ¹
UDP Forwarding	All platforms that support the Edge, Advanced Edge, and Core licenses
UDP BootP relay forwarding	All platforms that support the Edge, Advanced Edge, and Core licenses

¹ see [Table 3: Standard and Upgrade Licenses for ExtremeXOS Switches](#) on page 7

Table 5: ExtremeXOS Edge License Features (continued)

ExtremeXOS Software Feature	Supported Platforms
IPv4 unicast routing, including static routes	All platforms that support the Edge, Advanced Edge, and Core licenses. ¹
IPv4 multicast routing, including static routes	All platforms that support the Edge, Advanced Edge, and Core licenses. ¹
IPv4 Duplicate Address Detection (DAD)	All platforms that support the Edge, Advanced Edge, and Core licenses
IPv6 unicast routing, including static routes	All platforms that support the Edge, Advanced Edge, and Core licenses. ¹
IPv6 interworking—IPv6-to-IPv4 and IPv6-in-IPv4 configured tunnels	All platforms that support the Edge, Advanced Edge, and Core licenses. ¹
IPv6 Duplicate Address Detection (DAD) without CLI management	All platforms that support the Edge, Advanced Edge, and Core licenses. ¹
IPv6 Duplicate Address Detection (DAD) with CLI management	All platforms that support the Edge, Advanced Edge, and Core licenses
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 	All platforms that support the Edge, Advanced Edge, and Core licenses. ¹
IP address security: <ul style="list-style-type: none"> • DHCP snooping • Trusted DHCP server • Source IP lockdown • ARP validation 	All platforms that support the Edge, Advanced Edge, and Core licenses
IP Flow Information Export (IPFIX)	All platforms that support the Edge, Advanced Edge, and Core licenses. ¹
Multi-Switch Link Aggregation Group (MLAG)	All platforms that support the Edge, Advanced Edge, and Core licenses
Policy based routing (PBR) for IPv4	All platforms that support the Edge, Advanced Edge, and Core licenses
Policy based routing (PBR) for IPv6	All platforms that support the Edge, Advanced Edge, and Core licenses
PIM snooping	All platforms that support the Edge, Advanced Edge, and Core licenses. ¹
Protocol-based VLANs	All platforms that support the Edge, Advanced Edge, and Core licenses. ¹
RIP v1/v2	All platforms that support the Edge, Advanced Edge, and Core licenses. ¹
RIPng	All platforms that support the Edge, Advanced Edge, and Core licenses. ¹

Table 5: ExtremeXOS Edge License Features (continued)

ExtremeXOS Software Feature	Supported Platforms
Routing access policies	All platforms that support the Edge, Advanced Edge, and Core licenses. ¹
Route maps	All platforms that support the Edge, Advanced Edge, and Core licenses. ¹
Universal Port—VoIP auto configuration	All platforms that support the Edge, Advanced Edge, and Core licenses. ¹
Universal Port—Dynamic user-based security policies	All platforms that support the Edge, Advanced Edge, and Core licenses. ¹
Universal Port—Time-of-day policies	All platforms that support the Edge, Advanced Edge, and Core licenses. ¹
SummitStack (switch stacking using native or dedicated ports)	Summit X440-24p, X440-24t, X440-8p and X440-48p using dedicated SummitStack ports, X460 family switches, and E4G-400 with a SummitStack or SummitStack V-80 module. Summit X440-8t, X440-48t with dedicated SummitStack ports. Summit X440-24t-10G with ethernet ports. Summit X460-G2 with X460-G2-VIM-2SS optional card. Summit X480 family switches with a VIM2-SummitStack, VIM2-SummitStack-V80, or VIM2-SummitStack128 module. Summit X670V switches with a VIM4-40G4X module.
SummitStack-V (switch stacking using dual purpose data ports)	Summit X770-32 using port 101-104. See the platforms listed in Support for Alternative Stack Ports in the Basic Switch Operation volume of the <i>ExtremeXOS User Guide</i> .

Advanced Edge License Features

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



Note

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

Table 6: ExtremeXOS Advanced Edge License Features

ExtremeXOS Software Feature	Supported Platforms
EAPS Advanced Edge (multiple physical rings)	All platforms that support the Advanced Edge and Core licenses.
ERPS-more domains (allows 32 rings with matching ring ports)	BlackDiamond 8000 series Summit family switches

² see [Table 3: Standard and Upgrade Licenses for ExtremeXOS Switches](#) on page 7

Table 6: ExtremeXOS Advanced Edge License Features (continued)

ExtremeXOS Software Feature	Supported Platforms
ESRP-Full	Summit X460, X480, X670, and X770 series switches BlackDiamond 8000 series
ESRP-Virtual MAC	BlackDiamond 8000 series Summit family switches
OSPFv2-Edge (limited to max of 4 active interfaces)	All platforms that support the Advanced Edge and Core licenses. ²
OSPFv3-Edge (limited to max of 4 active interfaces)	All platforms that support the Advanced Edge and Core licenses. ²
PIM-SM-Edge (limited to max of 4 active interfaces)	All platforms that support the Advanced Edge and Core licenses. ²
VRRP	All platforms that support the Advanced Edge and Core licenses. ²

Core License Features

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

Table 7: ExtremeXOS Core License Features

ExtremeXOS Software Feature	Supported Platforms
EAPS "Full" (common links)	Core license platforms listed in Table 3: Standard and Upgrade Licenses for ExtremeXOS Switches on page 7
PIM DM "Full"	Core license platforms listed in Table 3: Standard and Upgrade Licenses for ExtremeXOS Switches on page 7
PIM SM "Full"	Core license platforms listed in Table 3: Standard and Upgrade Licenses for ExtremeXOS Switches on page 7
PIM SSM "Full"	Core license platforms listed in Table 3: Standard and Upgrade Licenses for ExtremeXOS Switches on page 7
OSPFv2 "Full" (not limited to 4 active interfaces)	Core license platforms listed in Table 3: Standard and Upgrade Licenses for ExtremeXOS Switches on page 7
OSPFv3 "Full" (not limited to 4 active interfaces)	Core license platforms listed in Table 3: Standard and Upgrade Licenses for ExtremeXOS Switches on page 7
BGP4 and MBGP (BGP4+) for IPv4ECMP	Core license platforms listed in Table 3: Standard and Upgrade Licenses for ExtremeXOS Switches on page 7

Table 7: ExtremeXOS Core License Features (continued)

ExtremeXOS Software Feature	Supported Platforms
BGP4 and MBGP (BGP4+) for IPv6	Core license platforms listed in Table 3: Standard and Upgrade Licenses for ExtremeXOS Switches on page 7
IS-IS for IPv4	Core license platforms listed in Table 3: Standard and Upgrade Licenses for ExtremeXOS Switches on page 7
IS-IS for IPv6	Core license platforms listed in Table 3: Standard and Upgrade Licenses for ExtremeXOS Switches on page 7
MSDP	Core license platforms listed in Table 3: Standard and Upgrade Licenses for ExtremeXOS Switches on page 7
Anycast RP	Core license platforms listed in Table 3: Standard and Upgrade Licenses for ExtremeXOS Switches on page 7

Feature Pack Features

The ExtremeXOS software features are listed in the following table are managed as feature packs.

Table 8: ExtremeXOS Feature Pack Features

Feature Pack	Feature	Platform Support	XMOD Required
CNA Feature Pack	Provides the client software to work with the Converged Network Analyzer (CNA) software from Avaya Inc.®	All platforms.	Yes (ssh xmod must be installed first)
Direct Attach Feature Pack	Direct attach	Summit X460, X480, X670, and X770 series switches BlackDiamond 8800 series switches BlackDiamond X8 series switches	No

Table 8: ExtremeXOS Feature Pack Features (continued)

Feature Pack	Feature	Platform Support	XMOD Required
MPLS Feature Pack (IPv4 only)	<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 • VPWS with ESRP redundant access • Fast Reroute (FRR) • Support for PW counters • User Virtual Routers • L3VPN 	Summit X460, X460-G2 ³ , X480, X670, X670-G2 and X770 series switches. E4G-200 and E4G-400 cell site routers. ⁴ BlackDiamond 8900 xl-series modules. ⁵ BlackDiamond 8900 xm-series modules ⁶ BlackDiamond X8 series switches	No
Legacy CLI Feature Pack	Support for legacy CLI commands	All platforms.	Yes
Network Timing Feature Pack	Precision Time Protocol (PTPv2)	E4G-200 and E4G-400 cell site routers Summit X460, X460-G2, X670-G2, and X770 Series switches	No
SSH Feature Pack	<ul style="list-style-type: none"> • Secure Shell 2 (SSH2) • Secure Copy Protocol 2 (SCP2) • Secure File Transfer Protocol (SFTP) 	All platforms	Yes
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 	Summit X430, X440, X460, X460-G2, X670, and X670-G2 series switches	No
OpenFlow Feature Pack	OpenFlow	Summit X440, X460, X460-G2, X480, X670, and X670-G2 series switches	Yes

³ Summit X460 switches require the Advanced Edge or Core license to support MPLS.

⁴ For the E4G-200, you obtain the MPLS feature pack by upgrading to an Advanced Edge license. For the E4G-400, the Advanced Edge license is standard and already includes the MPLS feature pack.

⁵ To run MPLS with BlackDiamond 8900 xl-series modules, a BlackDiamond 8800 series switch requires ExtremeXOS Release 12.5 or later, BlackDiamond 8900-MSM128, and BlackDiamond 8900 xl-series modules. No other modules are supported when MPLS runs on a BlackDiamond 8800 series switch with ExtremeXOS 12.5.

⁶ To run MPLS with BlackDiamond 8900 xm-series modules, a BlackDiamond 8800 series switch requires ExtremeXOS Release 12.6 or later, BlackDiamond 8900-MSM128, and BlackDiamond 8900 xl- or xm-series modules. No other modules are supported when MPLS runs on a BlackDiamond 8800 series switch with ExtremeXOS 12.6 or later.

Table 8: ExtremeXOS Feature Pack Features (continued)

Feature Pack	Feature	Platform Support	XMOD Required
TRILL Feature Pack	TRILL	Summit X670, X770 BlackDiamond X8	No
Capacity based License for Ports Feature Pack		Only platforms with 40G and/or 100G ports	No

Feature packs are distributed in one of the following forms:

- Software component within ExtremeXOS software
- Modular software package, which is also known as an xmod file (due to the .xmod filename extension)

To start using a feature pack that is a component of ExtremeXOS, you must purchase a license to use the feature pack as described in [Software Upgrade and Boot Options](#) in the *ExtremeXOS User Guide*.

To start using a feature pack that is distributed in a modular software package, you must request the xmod file from your supplier and install it as described in [Installing a Modular Software Package](#) in the *ExtremeXOS User Guide*.

**Note**

The SSH feature pack is the exception to the above rules. The SSH feature pack is distributed in a modular software package and requires a license before feature operation. There is no charge for the license.

ExtremeXOS Non-Extreme Optics Licensing

Currently you can purchase and use optical devices from Extreme Networks to attach to high-speed ports, and you can also purchase and use optical devices from third-party vendors. In keeping with standard industry practices, Extreme Networks restricts the use of high-speed third-party optical devices, unless you purchase a feature license to allow their unrestricted use (direct support for such usage will continue to be limited).

**Note**

This feature does not require an xmod.

This feature creates a feature license named "3rd Party Optics". Like other feature licenses, once you apply the license to a specific box, that box is permanently enabled to allow the unrestricted use of third-party high speed transceivers. Without a license, ports that are attached to such devices are continuously restricted. This restriction does not apply to stacking ports.

A restricted port has egress rate limiting applied at the rate of 25% of capacity. All egress traffic is subject to the rate limiter, as if a user-defined egress rate limiter were configured and enabled. The restriction is flagged by `show` command output, and warning messages are issued when optical

devices are inserted and at port 'enable' time (CLI `enable`). The restriction is lifted when the proper license is installed.



Note

Purchase of a single optics license allows all third-party devices for the life of the box.

When the first third-party high speed transceiver is detected, the system odometer value is stored in nvram. This serves as the start time for the 90 day trial period. During the trial period, warning messages are generated whenever a third-party high speed transceiver is detected, an attached port is enabled, or when another day ticks off the trial period; but the ports will not be restricted until the trial period ends. No warnings are generated if there are no flagged transceivers attached, but the trial period will continue to count down. When the trial period expires, ports are restricted when the next enable is performed (a port actively forwarding data will not be immediately restricted).

Caveats and Restrictions

The ExtremeXOS 3rd Party Optics Licensing feature has the following caveats and restrictions:

- The system reads and interprets the license information, and maintains a flag that indicates the presence of the optics license.
- The system reads and interprets the trial period time, and generates a message if a threshold is reached.

At optical device insertion time:

- If the optical device license is installed, no further action is necessary.
- If the device is an Extreme device, no further action is necessary.
- If this is the first third-party high speed device detected, tells EMP process to start the trial period.
- Sets appropriate flags in the port media data, distributes to VlanMgr process.
- Adds rate limiter restriction if necessary.
- Generates warning messages as appropriate.

If you remove the device, the following conditions occur:

- The system updates port media data, and distribute to VlanMgr process.

When you enable a port, the following conditions occur:

- The system determines if the port is restricted (especially in cases where the trial period expired, and the port was active before).
- The system generates a warning message to a console with restricted ports.
- The system generates a warning EMS message that indicates a restriction, or trial period status.

When you enable a license, the system reads and interprets the new license information. If it determines the optics license is now active, and it was not active before, the following conditions occur:

- Sets the optics license present flag.
- Searches the port list for restricted ports, sets flags, and distributes to VlanMgr.

- Removes all restriction indications.

**Note**

This feature requires you to coordinate with other Extreme corporate processes, including how to generate a license, and how to purchase a license.

Supported Platforms

All platforms that support high-speed optical devices are supported with this feature. The current list of devices subject to restriction includes:

- QSFP+ SR4
- QSFP+ LR4
- QSFP+ Passive Copper 0.5m Cable
- QSFP+ Passive Copper 1m Cable
- QSFP+ Passive Copper 2m Cable
- QSFP+ Passive Copper 3m Cable
- QSFP+ Passive Copper 5m Cable
- QSFP+ Active Optical 5m Cable
- QSFP+ Active Optical 10m Cable
- QSFP+ Active Optical 20m Cable
- QSFP+ Active Optical 50m Cable
- QSFP+ Active Optical 100m Cable
- QSFP+ to SFP+ Fan Out Passive Copper 1m Cable - QSFP+ end
- QSFP+ to SFP+ Fan Out Passive Copper 2m Cable - QSFP+ end
- QSFP+ to SFP+ Fan Out Passive Copper 3m Cable - QSFP+ end
- QSFP+ to SFP+ Fan Out Passive Copper 5m Cable - QSFP+ end
- CFP2 LR4
- CFP2 SR10

Direct Attach Feature Pack

The Direct Attach feature, which is 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.

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

For more information the direct attach feature, see [Managing Direct Attach to Support VEPA](#) in the *ExtremeXOS User Guide*.

Legacy CLI Feature Pack

The Legacy CLI feature enables those who have experience with legacy, mode-based CLIs to use familiar commands to start using the ExtremeXOS software using commands they already know.

The Legacy CLI feature is distributed in a file that you can download and install as described in [Software Upgrade and Boot Options](#).

For more information on the Legacy CLI feature, see the *Legacy CLI Quick Reference Guide*.

MPLS Feature Pack (IPv4 Only)

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



Note

The MPLS Feature Pack features are supported only on the platforms listed in the [Feature License Requirements](#) document. BlackDiamond 8800 series switches require specific software and hardware to support MPLS, and these requirements are specified in the same preceding table.

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

This feature pack is included with the Advanced Edge and Core software licenses and can be enabled by purchasing and enabling a feature pack license key.

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) feature on the Summit X460-G2, X670-G2, and X770 Series switches, and the E4G-200 and E4G-400 cell site routers.

This feature pack is included with all ExtremeXOS software licenses and can be enabled by purchasing and enabling a feature pack license key. The Network Timing Feature Pack is available only on E4G-200, E4G-400, X770, X670-G2, and X460-G2.

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

SSH Feature Pack

Secure Shell 2 (SSH2) is a feature of the ExtremeXOS software that allows you to encrypt session data between a network administrator using SSH2 client software and the switch or to send encrypted data from the switch to an SSH2 client on a remote system.

Configuration, image, public key, and policy files can be transferred to the switch using the Secure Copy Protocol 2 (SCP2) or the Secure File Transfer Protocol (SFTP).

SSH contains strong encryption algorithms which heighten the export controls required in the US and other countries. Once the export clearance requirements are met, there is no charge to download the SSH modular software package and enable this feature. For more information, see [Software Upgrade and Boot Options](#)

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