ExtremeXOS® v34.1.1 Licensing Guide

Comprehensive Licensing Features and Installation

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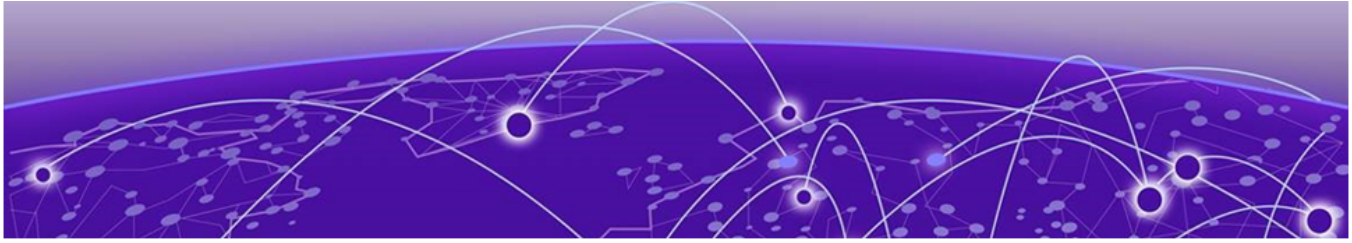

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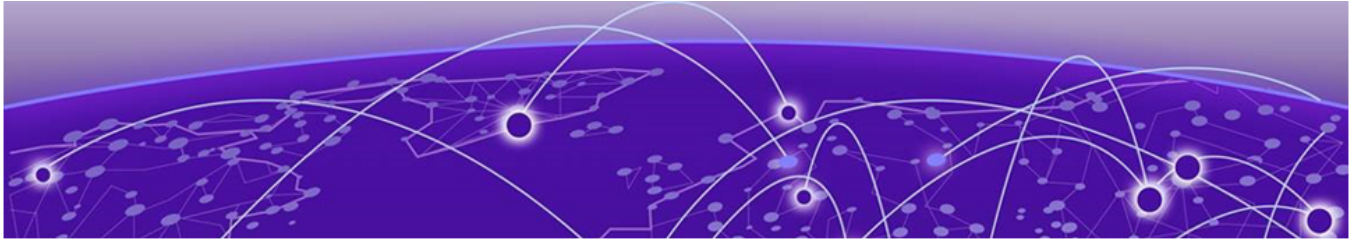


Abstract

ExtremeXOS® v34.1.1 Licensing Guide details licensing models, feature availability, and management procedures for non-universal hardware switches. Four cumulative license tiers are documented: Value Edge provides foundational L2 switching and basic L3 routing on X435 only; Edge adds L3 routing, virtual routers, DHCP services, and policy-based routing across all platforms; Advanced Edge adds advanced routing protocols, multicast, precision timing using AVB, and VXLAN; and Core adds unlimited advanced routing, full multicast support, and interdomain capabilities. Installation procedures cover license acquisition through Extreme Networks Support portal, manual switch installation, revocation, and status display via CLI. Trial licenses provide free evaluation access to Edge features. Optional feature licenses extend capabilities: MPLS for advanced routing and VPN services, AVB for precision time synchronization, Network Timing for PTPv2 (not supported on non-universal platforms), MACsec for link-level encryption, Optics XMOD for downloadable optical transceiver support, and ExtremeCloud IQ Agent for cloud platform integration. MACsec uses slot-based licensing enabling per-slot control in stacked configurations and is perpetual-only. License tiers build cumulatively, with features from lower tiers included in higher tiers.

Preface

Read the following topics to learn about:

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

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 Extreme Networks switches, the product is referred to as *the switch*.

Table 1: Notes and warnings

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

Table 2: Text

Convention	Description
`screen displays`	This typeface indicates command syntax, or represents information as it is displayed on the screen.
The words *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 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**
Words in italicized type	Italics emphasize a point or denote new terms at the place where they are defined in the text. Italics are also used when referring to publication titles.
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.
italic 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, *member*[*member*...].
\	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.

Documentation and Training

Find Extreme Networks product information at the following locations:

Current Product Documentation
Release Notes

Hardware and Software Compatibility for Extreme Networks products
Extreme Optics Compatibility
Other Resources such as articles, white papers, and case studies

Open Source Declarations

Some software files have been licensed under certain open source licenses. Information is available on the Open Source Declaration page.

Training

Extreme Networks offers product training courses, both online and in person, as well as specialized certifications. For details, visit the Extreme Networks Training page.

Help and Support

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 2800. 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 Product Announcements

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

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

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

Extreme Support Portal

The Extreme Networks Extreme Support Portal provides access to:

- License management
- Firmware downloads
- Case management
- GTAC Knowledge base
- And more

To access the portal, you must first create an account. The Extreme Support Portal provides separate registration forms for End Customers and Partners.

Before you begin, gather the following: A valid corporate email address — required to receive the appropriate level of portal access. Your company details: company name, address, phone number (include country code if outside the US), job title, and job role. At least one supporting identifier: Sold-to number, serial number, contract number, or Purchase Order (PO) number.

Create an End Customer Extreme Support Portal Account

The Extreme Support Portal provides separate registration forms for End Customers and Partners. Use this task to create an End Customer account.

Note
If you are adding a new user to an existing account, the new user must complete and be vetted through the same registration process.

The portal registration page is at https://extreme-networks.my.site.com/.

1. Go to the Extreme Support Portal and select **Login or Signup** on the login page.
2. On the login page, select **Create a new Extreme Customer Portal Account** .
3. Complete all required fields (marked *). Use your corporate email address to ensure the appropriate access level.

Important
Do not register with a personal email address.

4. Read the Support Portal Terms of Use and select the acknowledgment check box to accept.

   Important
   You must accept the Terms of Use before you can submit the form. You can adjust or withdraw consent at any time through the Email Preference Center.

5. Select **Register**.

   A confirmation message appears on the page and a password setup email is sent to your corporate email address.
6. Open the password setup email and follow the instructions to create your portal password.

   Tip
   If the email does not appear in your inbox within a few minutes, check your spam or junk mail folder.

7. To log in to the support portal go to: https://extremesaas.my.site.com/.

Create a Partner Extreme Support Portal Account

The Extreme Support Portal provides separate registration forms for End Customers and Partners. Use this task to create a Partner account.

The portal registration page is at https://extreme-networks.my.site.com/.

1. Go to the Extreme Support Portal and select **Login or Signup** on the login page.
2. On the login page, select **Create a new Extreme Partner Portal Account**.
3. Complete all required fields (marked *). Use your corporate email address to ensure the appropriate access level.

   Important
   Do not register with a personal email address.

4. Read the following terms and select the required check boxes:
   - Support Portal Terms of Use
   - Extreme Networks Standard Reseller Terms and Conditions
   - Trade Compliance Terms and Conditions

   You can adjust or withdraw consent at any time through the Email Preference Center.
5. Select **Register**.

   A confirmation message appears on the page and a password setup email is sent to your corporate email address.
6. Open the password setup email and follow the instructions to create your portal password.

   Tip
   If the email does not appear in your inbox within a few minutes, check your spam or junk mail folder.

7. To log in to the support portal go to: https://extremesaas.my.site.com/.

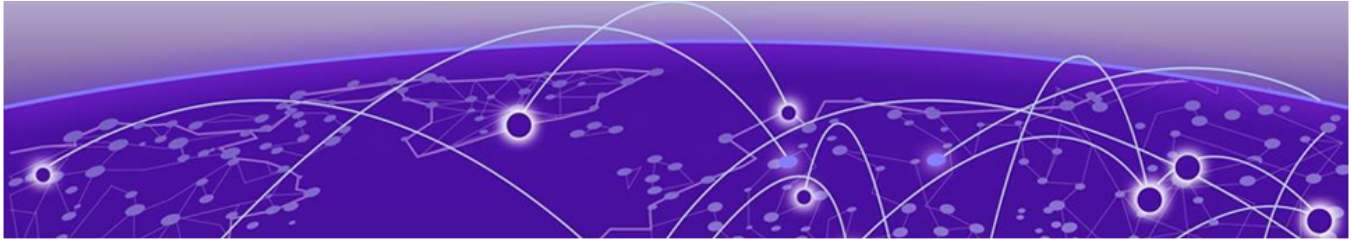
Send Feedback

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

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

To send feedback, email us at Product-Documentation@extremenetworks.com.

Provide as much detail as possible including the publication title, topic heading, and page number (if applicable), along with your comments and suggestions for improvement.



Licensing Overview

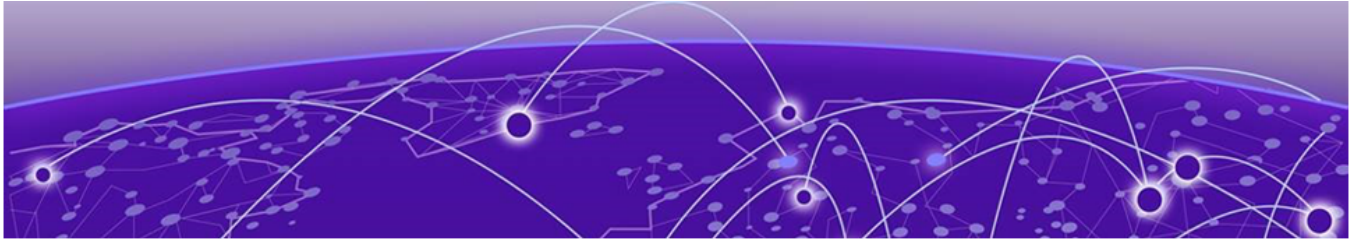
The ExtremeSwitching family of switches includes one category of switches with different license levels:

Switch Category	Switches	Applicable License Levels
Non-Universal Hardware switches (see Overview for non-Universal Hardware Switches	X435	Value Edge
	X465 and X695	Edge, Advanced Edge, Core

Extreme Platform ONE™ Licensing Support

Version 33.2.1 adds Extreme Platform ONE support and licensing for non-Universal platforms. While Extreme Platform ONE licenses can be applied to non-Universal switches, an Extreme Platform ONE license is not required for ExtremeXOS to activate or operate any level of features. This means that non-Universal switches remain capable of supporting the perpetual feature licenses to achieve advanced features as applicable to the specific switch family.

Extreme Platform ONE is supported on X435 and X465 series switches.



Licensing Types for Non-Universal Switches

Value Edge License on page 15
Edge License on page 15
Advanced Edge License on page 16
Core License on page 17

Cumulative License Tiers

ExtremeXOS non-universal hardware switches support four cumulative license tiers. Each tier includes all features from lower tiers plus additional capabilities. License tiers are:

- **Value Edge**—Foundational L2 switching and basic L3 routing. Available exclusively on X435 series; cannot be upgraded.
- **Edge**—Adds L3 routing, virtual routers (VRF), DHCP services, and policy-based routing. Standard on X435, X465, X695.
- **Advanced Edge**—Adds advanced routing protocols (OSPF, BGP auto-peering), multicast (PIM-SM), precision timing (AVB), and VXLAN. Standard on X465, X695; upgradeable to Core.
- **Core**—Adds unlimited advanced routing (full OSPF, BGP, IS-IS), full multicast support (PIM DM/SM/SSM), and Anycast RP. Available on X465, X695 as upgrade.

License Tier Comparison

Table 4: ExtremeXOS License Tier Characteristics

Characteristic	Value Edge	Edge	Advanced Edge	Core
L2 Switching	Yes	Yes (cumulative)	Yes (cumulative)	Yes (cumulative)
L3 Routing	Basic static	Yes (RIP, static)	Yes (cumulative)	Yes (cumulative)
Virtual Routers (VRF)	No	Yes	Yes (cumulative)	Yes (cumulative)
OSPF (routing protocol)	No	No	OSPFv2/v3 Edge (limited)	OSPFv2/v3 Full (unlimited)

Table 4: ExtremeXOS License Tier Characteristics (continued)

Characteristic	Value Edge	Edge	Advanced Edge	Core
BGP (routing protocol)	No	No	BGP auto-peering	BGP4 Full + MBGP
IS-IS (routing protocol)	No	No	No	Yes (IPv4/IPv6)
Multicast Routing	Snooping only	PIM snooping	PIM-SM Edge	PIM DM/SM/SSM Full
VLAN Aggregation	No	Yes	Yes (cumulative)	Yes (cumulative)
AVB / Precision Timing	No	No	Yes (GPTP, MVRP, MSRP)	Yes (cumulative)
VXLAN	No	No	Yes (X465, X695)	Yes (cumulative)
Python Scripting	No	Yes	Yes (cumulative)	Yes (cumulative)
Upgrade Path	No (X435 only)	To Advanced Edge (X465, X695)	To Core (X465, X695)	Terminal (no upgrade)

License Selection Guide

Table 5: Recommended License Type by Deployment Scenario

Deployment Scenario	Recommended License Tier
Branch office or access-layer switching with basic routing	Value Edge (X435) or Edge (X435, X465, X695)
Multi-site deployment requiring virtual routing and policy-based forwarding	Edge (with VRF and PBR capabilities)
Campus network requiring OSPF routing and multicast support	Advanced Edge (OSPF Edge, PIM-SM Edge)
Data center or service provider network requiring full BGP, OSPF, multicast, and overlay networking	Core (unlimited routing protocols, full multicast, VXLAN)
Audio/Video streaming or time-sensitive applications	Advanced Edge or Core (AVB with GPTP precision timing)

Platform and Tier Availability

License tier availability varies by platform:

- **X435 Series:** Value Edge (standard, non-upgradeable) and Edge (standard, non-upgradeable)
- **X465 Series:** Edge (standard) → Advanced Edge (standard) → Core (upgrade available)
- **X695 Series:** Edge (standard) → Advanced Edge (standard) → Core (upgrade available)

Value Edge License

Value Edge License

Value Edge License

The Value Edge License provides foundational L2 switching and L3 routing capabilities. This license is available exclusively on the X435 series and cannot be upgraded to Edge, Advanced Edge, or Core license levels. All features in the Value Edge License are included at factory default.

Included Features

Value Edge License includes:

- VLAN support (port-based, MAC-based, protocol-based, private VLANs, VLAN translation)
- Q-in-Q tunneling and VMAN support
- Link Aggregation Groups (LAG) static and dynamic (802.3ad LACP)
- Spanning Tree Protocol variants (STP 802.1D, 802.1w, 802.1s, MSTP)
- Link redundancy (ELRP, ELSM, EAPS edge, ERPS)
- Access Control Lists (ACLs) L2/L3, ingress/egress, with meters
- Authentication (802.1X, MAC-based, RADIUS/TACACS+, Web-based)
- MAC security (lockdown, limit)
- IP security (DHCP Option 82 L2 mode, DHCP snooping, IP lockdown)
- IGMP snooping (v1, v2, v3) and MVR support
- MLD snooping (v1, v2)
- QoS (egress port/queue rate shaping, limiting)
- Management (SNMP v3, SSH2, CLI, Web-based, syslog, sFlow)
- CLI scripting

Platform Support

Value Edge License is available exclusively on the X435 platform.

Edge License

Edge License

Edge License

The Edge License includes all Value Edge features and adds L3 routing capabilities, virtual routers, DHCP services, and policy-based routing. Edge License is standard on X435, X465, and X695 platforms.

Additional Features Beyond Value Edge

Edge License adds:

- IPv4 and IPv6 unicast/multicast routing (including static routes)
- User-created virtual routers (VRF) on X435, X465, X695
- DHCPv4 and DHCPv6 (server, client, relay, smart relay)
- Policy-based routing (PBR) for IPv4 and IPv6
- RIP v1/v2 and RIPng routing protocols
- PIM snooping
- Direct Attach (VEPA-based, data center simplification)
- Multi-Switch Link Aggregation Group (MLAG)
- ONEPolicy support
- IP Flow Information Export (IPFIX) on X465, X695
- IP NAT on X465, X695
- Python scripting
- Extreme Network Virtualization (XNV) on X465, X695
- SyncE on X465, X695
- SummitStack-V (dual-purpose data port stacking)

Platform Support

Edge License is standard on X435, X465, and X695 series.

Advanced Edge License

Advanced Edge License

The Advanced Edge License includes all Edge features and adds advanced routing, multicast routing, precision timing, and network virtualization capabilities. Advanced Edge is standard on X465 and X695 platforms and can be upgraded to the Core License.

Additional Features Beyond Edge

Advanced Edge License adds:

- OSPFv2 and OSPFv3 Edge (limited to 4 active interfaces max)
- OSPFv2 auto-peering on X465, X695
- BGP auto-peering on X465, X695
- PIM-SM Edge (Sparse Mode multicast routing)
- AVB (Audio Video Bridging) with GPTP, MVRP, MSRP
- EAPS Advanced Edge (multiple physical rings, shared ports)
- ERPS (up to 32 rings with multi-ring support)
- ESRP-Full and ESRP-Virtual MAC
- VRRP (Virtual Router Redundancy Protocol)

- VXLAN on X465, X695
- PSTag on X465, X695

Platform Support

Advanced Edge License is standard on X465 and X695 series. Upgradeable to Core License.

Core License

Core License

The Core License includes all Advanced Edge features and adds unlimited advanced routing protocols, full multicast support, and advanced interdomain capabilities. Core is not standard on any platform but can be purchased as an upgrade for X465 and X695 series.

Additional Features Beyond Advanced Edge

Core License adds:

- OSPFv2 Full (unlimited active interfaces, not limited to 4)
- OSPFv3 Full (unlimited active interfaces, not limited to 4)
- BGP4 and MBGP (BGP4+) for IPv4 ECMP and IPv6
- IS-IS for IPv4 and IPv6
- PIM DM Full (Dense Mode multicast)
- PIM SM Full (Sparse Mode multicast, unlimited)
- PIM SSM Full (Source-Specific Multicast)
- Anycast RP Using PIM (RFC 4610)
- MSDP (Multicast Source Discovery Protocol)

Platform Support and Upgrade Path

Core License is available as an upgrade on X465 and X695 series. It is not standard on any platform.

Installing and Managing Licenses

Installing and Uninstalling Licenses on non-Universal Hardware Switches on page 18
Displaying the Installed License Levels and Feature Licenses on page 19
Trial Licenses for non-Universal Hardware Switches on page 19

Installing and Uninstalling Licenses on non-Universal Hardware Switches

This section explains how to obtain and install/uninstall licenses for non-Universal Hardware switches.

In addition to the CLI method listed below, you can use ExtremeCloud IQ to obtain licenses. For information about using ExtremeCloud IQ, go to https://www.extremenetworks.com/support/documentation/extremecloud-iq/.

To obtain and install a license:

Note
You should have received by email a license voucher after your purchase of a switch. You will need the voucher ID number on this email to generate a license.

1. Go to the Extreme Portal to obtain a license file:
   a. Select **Asset** > **Licenses Home**.
   b. Select **Generate License**.
   c. In the **Generate License** dialog, type the ID number in the **Voucher ID** box, and then select **Next**.
   d. Enter the hardware serial number of the device the license will be applied to.
   e. Select the box to acknowledge the terms and conditions, and then select **Submit**.

   The Voucher Details page displays the license key or license file at the bottom.
2. If you have a license file (extension `.lic`):
   a. Load the license file onto the switch using either of the following commands:

   ```
   download [url url {vr vrname} | image [active | inactive] [[hostname | ipaddress] filename {{vr} vrname} {block-size block_size}] {partition} {install {reboot}}

   tftp get [ ip-address | host-name] { vr vr_name } { block-size block_size } remote-file local-file} {force-overwrite}
   ```

To copy from a USB: `cp old_name new_name` specifying `/usr/local/ext`. For example: `cp /usr/local/ext/old_name /usr/local/cfg/new_name`.

You can place the license file anywhere within the user-visible file system (for example: `/usr/local/*`).

b. Run the following command to install the license:

```
enable license file filename
```

3. If you have a license key (format xxxx-xxxx-xxxx-xxxx-xxxx), run the following command to install the license:

```
enable license {software} [key ]
```

To remove a license:

```
clear license [{software} | port-speed]
```

Caution
This command should be used only with the advice of a representative from Extreme Networks.

Displaying the Installed License Levels and Feature Licenses

You can display the license level and feature licenses installed on your switch by using the `show licenses {[slot slot |all]} {detail}` command.

Trial Licenses for non-Universal Hardware Switches

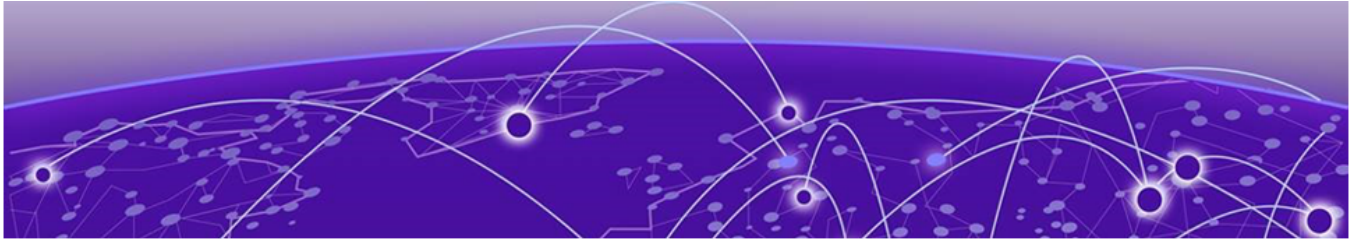
For non-Universal Hardware switches, you can obtain a trial license, which enables you to use the license for 30 days, and you can downgrade trial licenses to a lower software license level during the trial period. You can extend the time of the trial by 30 days two times (for a total of 90 days). Most feature licenses are enabled. After you enable the trial license, the switch behaves as if all software license levels and feature licenses 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 license is not included in the trial license.

To enable a trial license, issue the command `enable license trial`.

To clear a trial license, issue the command `clear license trial`. 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.



License Feature Reference

Value Edge License Features on page 20
Edge License Features on page 24
Advanced Edge License Features on page 26
Core License Features on page 27

Value Edge License Features

The Value Edge License includes features for L2 switching and L3 routing.

Note
The X435 is the only switch that supports the Value Edge license level, and can not be upgraded to any of the other license levels.

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 6: Value Edge License Features

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

Table 6: Value Edge License Features (continued)

software feature	Supported 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
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 26).	All platforms
Link Fault Signaling (LFS)	All platforms
ELSM (Extreme Link Status Monitoring)	All platforms

Table 6: Value Edge License Features (continued)

software feature	Supported platforms
ACLs, applied on ingress ports • IPv4 • Static	All platforms
ACLs, applied on ingress ports • IPv6 • Dynamic	All platforms
ACLs, applied on egress ports	All platforms
ACLs, ingress meters	All platforms
ACLs, egress meters	All platforms
ACLs • 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 • 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 • 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

Table 6: Value Edge License Features (continued)

software feature	Supported 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 • 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

Table 6: Value Edge License Features (continued)

software feature	Supported 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 Edge License Features on page 24.

Table 7: Edge License Features

Software feature	Supported platforms
Extended Edge Switching	X465, X695
Convergence End Point (CEP) detection	All Edge License 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 Edge License platforms
CLEAR-Flow	All Edge License platforms
System virtual routers (VRs)	All Edge License platforms
DHCPv4: • DHCPv4 server • DHCv4 client • DHCPv4 relay • DHCPv4 smart relay	All Edge License platforms
DHCPv6: • DHCPv6 relay • DHCPv6 prefix delegation snooping • DHCPv6 client • DHCPv6 smart relay • DHCPv6 remote ID	All Edge License platforms
User-created virtual routers (VRs) Virtual router and forwarding (VRF)	X435, X465, X695
Local-only, user-created virtual routers (VR)	X435
VLAN aggregation	All Edge License platforms
Multinetting for forwarding	All Edge License platforms
UDP Forwarding	All Edge License platforms
UDP BootP relay forwarding	All Edge License platforms

Table 7: Edge License Features (continued)

Software feature	Supported platforms
IPv4 unicast routing, including static routes	All Edge License platforms
IPv4 multicast routing, including static routes **Note:** This feature has limitations in the Edge and Advanced Edge licenses. See the *ExtremeXOS v34.1.1 User Guide*.	All Edge License platforms
IPv4 Duplicate Address Detection (DAD)	All Edge License platforms
IPv6 unicast routing, including static routes	All Edge License platforms
IPv6 interworking—IPv6-to-IPv4 and IPv6-in-IPv4 configured tunnels	X465, X695
IPv6 DAD without CLI management	All Edge License platforms
IPv6 DAD with CLI management	All Edge License platforms
IP security: • 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 Edge License platforms
IP address security: • DHCP snooping • Trusted DHCP server • Source IP lockdown • ARP validation	All Edge License platforms
IP Flow Information Export (IPFIX)	X465, X695
IP NAT	X465, X695
Keychain Manager	All Edge License platforms
Multi-Switch Link Aggregation Group (MLAG)	All Edge License platforms
ONEPolicy	All Edge License platforms
Policy based routing (PBR) for IPv4	All Edge License platforms
Policy based routing (PBR) for IPv6	All Edge License platforms
PIM snooping **Note:** This feature has limitations in the Edge and Advanced Edge licenses. See the *ExtremeXOS v34.1.1 User Guide*.	All Edge License platforms
Protocol-based VLANs	All Edge License platforms
RIP v1/v2	All Edge License platforms
RIPng	All Edge License platforms

Table 7: Edge License Features (continued)

Software feature	Supported platforms
Routing access policies	All Edge License platforms
Route maps	All Edge License platforms
SummitStack (switch stacking using native or dedicated ports)	Not supported
SummitStack-V (switch stacking using dual-purpose data ports)	All Edge License platforms. See the specific models listed in the "Support for Alternate Stacking Ports" section of the *ExtremeXOS v34.1.1 User Guide*.
SyncE	X465, X695
Python scripting	All Edge License platforms
Extreme Network Virtualization (XNV)	X465, X695

Advanced Edge License Features

The Advanced Edge License includes all Edge License features and the features in the following table. The Advanced Edge License is standard for the following switches:

- X465

  Upgradeable to Core
- X695

  Upgradeable to Core

Table 8: Advanced Edge License Features

Software Feature	Supported Platforms
AVB • Generalized Precision Time Protocol (GPTP) • Multiple VLAN Registration Protocol (MVRP) • Multiple Stream Registration Protocol (MSRP) • Platform Support	All Advanced Edge platforms. The X695 series switches have the AVB Feature License included in the Advanced Edge or Base License. You do not need to separately purchase and install the AVB Feature License for these switches.
BGP Auto-peering	X465, X695
EAPS Advanced Edge—multiple physical rings, and "common links", also known as "shared port".	All Advanced Edge platforms
ERPS-more domains (allows 32 rings with matching ring ports) and multi-ring support	All Advanced Edge platforms
ESRP-Full	All Advanced Edge platforms
ESRP-Virtual MAC	All Advanced Edge platforms
OSPFv2-Edge (limited to max of 4 active interfaces)	All Advanced Edge platforms
OSPFv2 Auto-peering	X465, X695

Table 8: Advanced Edge License Features (continued)

Software Feature	Supported Platforms
OSPFv3-Edge (limited to max of 4 active interfaces)	All Advanced Edge platforms
PIM-SM-Edge	All Advanced Edge platforms
PSTag	X465, X695
VRRP	All Advanced Edge platforms
VXLAN	X465, X695

Core License Features

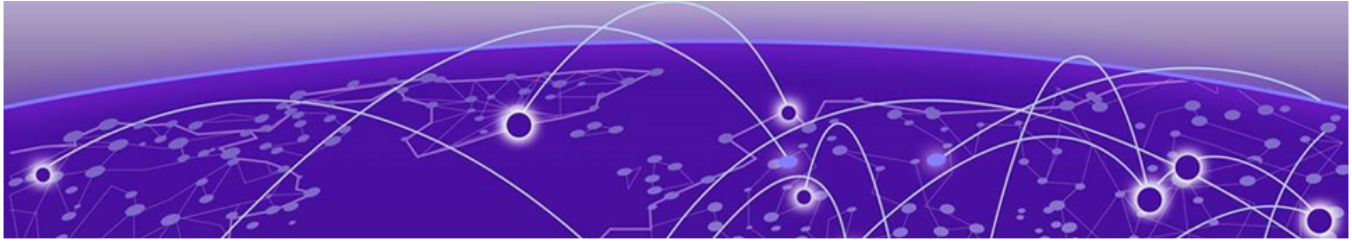
The Core License includes all Edge License features, Advanced Edge License features, and the features in the following table.

The Core License is not standard on any of the switches. The following switches can be upgraded to the Core License level:

- X465
- X695

Table 9: Core License Features

Software feature	Supported platforms
PIM DM "Full"	X465 and X695
PIM SM "Full"	X465 and X695
PIM SSM "Full"	X465 and X695
Anycast RP Using PIM (RFC 4610)	X465 and X695
OSPFv2 "Full" (not limited to 4 active interfaces)	X465 and X695
OSPFv3 "Full" (not limited to 4 active interfaces)	X465 and X695
BGP4 and MBGP (BGP4+) for IPv4 ECMP	X465 and X695
BGP4 and MBGP (BGP4+) for IPv6	X465 and X695
IS-IS for IPv4	X465 and X695
IS-IS for IPv6	X465 and X695
MSDP	X465 and X695
Anycast RP	X465 and X695
GRE tunneling	X465 and X695
EVPN	X465 and X695
Integrated Application Hosting (IAH)	X695



Optional Feature Licenses

MPLS Feature License on page 29
Network Timing Feature License on page 29
ExtremeCloud IQ Agent Support on page 29
Optics XMOD on page 30
MAC Security on page 30

Optional Feature Licenses

Optional feature licenses provide advanced networking capabilities beyond the standard license tiers. These features are available as separate purchases and can be combined with any license tier (Value Edge, Edge, Advanced Edge, or Core). Optional features are distributed either as built-in software components (requiring license purchase) or as downloadable modular software packages (XMOD files).

Available Optional Features

Table 10: Optional Feature Licenses Overview

Feature License	Capabilities	Supported Platforms	XMOD Required
MPLS Feature License	Multiprotocol Label Switching (MPLS), LDP, static LSPs, OSPF-TE, RSVP-TE, VPLS, H-VPLS, Fast Reroute, L3VPN	X465, X695	No
AVB Feature License	Generalized Precision Time Protocol (GPTP), Multiple VLAN Registration Protocol (MVRP), Multiple Stream Registration Protocol (MSRP)	X435, X465, X695 (included in Advanced Edge License on X695)	No
Network Timing Feature License	Precision Time Protocol v2 (PTPv2) for sub-microsecond accuracy	Not supported on ExtremeXOS non-universal platforms	No
MACsec License	IEEE 802.1AE link-level encryption for data link layer security	See MAC Security on page 30	No

Feature License Distribution Methods

Optional feature licenses are distributed in one of two forms:

- **Built-in software component:** Included in ExtremeXOS software. Purchase a license to enable the feature. No XMOD file download required.
- **Modular software package (XMOD):** Distributed as a separate downloadable file with .xmod extension. Request from your supplier and install separately. Required for Optics and ExtremeCloud IQ Agent.

Installing Optional Feature Licenses

Optional feature licenses follow the same installation procedures as base license tiers. For built-in features, purchase a license and apply the activation file to the switch. For XMOD files, request the modular package from your supplier and install using the standard license installation procedures.

MPLS Feature License

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

A separate feature license 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 license, the feature CLI commands are visible; without an enabled MPLS feature license, you do not see any feature commands on the console.

Network Timing Feature License

This feature is not supported on any platforms in this release. Support for X670-G2 series switches was removed in 30.7, and for X460-G2 series switches in 31.2.

ExtremeCloud IQ Agent Support

Version 31.1 and later supports ExtremeCloud IQ. This release supports device discovery, basic monitoring, visibility into homogenous stacking, and the ability to configure an optional user-defined virtual router (VR) and address of the server for ExtremeCloud IQ agent to connect to. These values are used instead of any auto-detected values.

Additionally, ExtremeCloud IQ supports BGP Auto-peering.

```
disable iqagent

enable iqagent
```

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

Table 11: Supported Platforms

Switch Series	Switch Models
X435	X435-8T-4S X435-8P-4S X435-8P-2T-W X435-24T-4S X435-24P-4S
X465	X465-48P X465-24MU-24W X465-24W X465-48W X465-24MU

Optics XMOD

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

MAC Security

MACsec Feature License

The MACsec Feature License provides IEEE 802.1AE link-level encryption and frame authentication. MACsec is a perpetual-only license and is not available as a subscription or trial license. MACsec must be purchased as a separate feature license using SKU PRD-EXOS-MACSEC.

Platform Support

MACsec is supported on the following ExtremeXOS platforms:

Table 12: MACsec-Supported Platforms and Ports

Platform	Port Support	LRM/Adapter Required
X435	All front-panel ports (except stacking ports)	No
X465	All SFP/SFP+ ports and selected front-panel ports	Varies by port
X695	All front-panel ports (except stacking ports)	No

License Behavior by Switch Configuration

MACsec licensing behavior depends on switch type and license installation:

Table 13: MACsec License Behavior

Configuration	Without License	With License
Standalone Switch	• Only `show macsec` command available • MACsec cannot be configured or enabled	• All MACsec commands available • MACsec can be configured and enabled
Stacked Switches	• All MACsec commands available • MACsec can be configured on MACsec-capable slots • MACsec cannot be enabled without license	• All MACsec commands available • MACsec can be configured and enabled on licensed slots only

Note
In a stacked configuration, any slot configured with a MACsec-capable module can be configured for MACsec, even if the slot is not physically present or does not have a valid MACsec license installed. However, MACsec can only be enabled on slots with a valid license.

License Requirements

MACsec licensing requirements:

- MACsec is perpetual-only; trial licenses and subscription licenses do not support MACsec
- Purchase using SKU PRD-EXOS-MACSEC
- Slot-based licensing; license must be installed per slot in stacked configurations
- Install using standard license installation procedures