



Switch Engine™ Feature License Requirements

for Version 32.1

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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 ExtremeSwitching switches or SLX routers, the product is referred to as *the switch* or *the router*.

Table 1: Notes and warnings






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

Table 2: Text

Convention	Description
screen displays	This typeface indicates command syntax, or represents information as it is displayed on the screen.
The words <i>enter</i> and <i>type</i>	When you see the word <i>enter</i> in this guide, you must type something, and then press the Return or Enter key. Do not press the Return or Enter key when an instruction simply says <i>type</i> .
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.
<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 and Switch Engine Publications

- [Switch Engine 32.1 Command Reference Guide](#)
- [Switch Engine 32.1 Feature License Requirements](#)
- [Switch Engine 32.1 User Guide](#)
- [Switch Engine 32.1 Release Notes](#)
- [ExtremeXOS Quick Guide](#)
- [Extreme Hardware/Software Compatibility and Recommendation Matrices](#)

- [Extreme Optics Compatibility](#)
- [Switch Configuration with Chalet for ExtremeXOS 21.x and Later](#)
- [ACL Solutions Guide](#)
- [Using AVB with Extreme Switches](#)

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

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

To send feedback, do either of the following:

- Access the feedback form at <https://www.extremenetworks.com/documentation-feedback/>.
- Email us at documentation@extremenetworks.com.

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

Help and Support

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 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.



License Overview

The ExtremeSwitching family of Universal switches includes two different license levels: Base and Premier.

The following figure illustrates that the Premier license level builds on the features of the Base license.

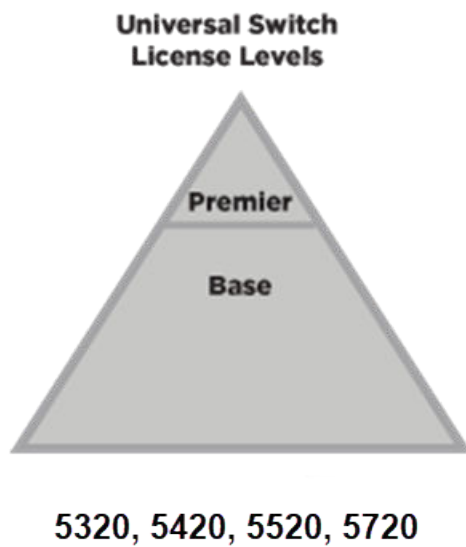


Figure 1: License Levels for Universal Switches

In previous releases, non-Universal Hardware and Universal switch license levels correlated in the following way:

Premier = Core

Base = Advanced Edge + AVB



Overview for Universal Hardware Switches

[Installing and Uninstalling Licenses on Universal Switches](#) on page 10

[Displaying the Installed License Levels and Feature Licenses](#) on page 11

[Factory Default \(Evaluation\) License for Universal Hardware Switches](#) on page 11

This document explains the license levels and feature licenses available for universal hardware switches, and lists the features that they support.

Switch Engine software supports the following license levels for the universal hardware switches:

- **Base**—included as standard (see [Base License Features](#) on page 13)
- **Premier** (see [Premier License Features](#) on page 16)

The Base license provides a basic feature set and the Premier license adds additional functionality.

Table 4: Standard and Upgrade Licenses for Universal Hardware Switches

Switch platform	Base	Premier
ExtremeSwitching 5320	Standard	Upgrade
ExtremeSwitching 5420	Standard	Upgrade
ExtremeSwitching 5520	Standard	Upgrade
ExtremeSwitching 5720	Standard	Upgrade

Feature Licenses

To supplement the license levels, additional capabilities can be added by purchasing feature licenses (see [Feature Licenses](#) on page 17).

Additional General License Information

Software licenses are stored in the EEPROM and, after enabled, persist through reboots, software upgrades, power outages, and reconfigurations. The keys are unique to the switch, but can be transferred (see [Transferring Licenses](#) on page 11).

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 displays 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.
```

Installing and Uninstalling Licenses on Universal Switches

This section explains how to obtain and install/uninstall licenses on universal hardware switches.

Obtaining and Installing Licenses

For universal hardware switches, you can activate a license on the switch using either of the following methods:

1. Manual activation by obtaining the license activation file from Support Portal.
2. Automated activation using ExtremeCloud IQ. For information about using ExtremeCloud IQ for bulk automated license activation, go to <https://www.extremenetworks.com/support/documentation/extremecloud-iq/>.

For manual license generation and installation:

1. Follow manual activation instructions for license generation available on the [Extreme Portal](#): **Products > Products Home > ExtremeSwitching > Universal > EXOS (for your switch) > Activation Instructions**.
2. 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/*`).

3. To install the license, use the following command:

```
install license file filename {slot slot}
```

This command installs all of the license features contained in the selected license file to the specified slot (node).

Uninstalling Licenses Temporarily

You can temporarily uninstall a license from a switch. This enables you to retain the license entitlement on the switch, and thus, the original license can be used to reinstall the license. You can use this option to temporarily disable a license.

To uninstall a license temporarily from a universal hardware switch, use the following command:

```
uninstall license file filename [{revoke revocation_file} | withhold ]
{slot slot} using the withhold option.
```

To temporarily uninstall a specific license feature, such as MAC Security (MACsec), from a universal hardware switch, use the following command:

```
uninstall license product product_name [revoke revocation_file |
withhold] {slot slot}
```

 using the **withhold** option.

Transferring Licenses

You can permanently remove a license, which enables you to transfer the license to another switch. This should only be done when preparing to return a defective switch for a replacement switch (RMA).

The `uninstall license file filename` command accepts *filename* as a `.lic` file that contains one or more licenses to be uninstalled. This is the license file that was used to install license.

The `uninstall license product product_name` command accepts *product_name* as the name of the license product to be uninstalled. This is the product name as it appears with the **show licenses** command.

- To uninstall a license permanently from a universal hardware switch, use the following command:

```
uninstall license file filename [{revoke revocation_file} | withhold ]
{slot slot}
```

 using the **revoke** option.

- To permanently uninstall a specific license product, such as PRD-5000-MACSEC, from a universal hardware switch, use the following command:

```
uninstall license product product_name [revoke revocation_file |
withhold] {slot slot}
```

 using the **revoke** option.

The **revoke** option invalidates the feature license and generates a revocation certificate, which is the first step to release the license entitlement back to the license entitlement manager (LEM). If the specified file name (for *revocation_file*) does not have an `.rvk` extension, it is automatically appended.

To transfer a license from a defective unit to a working unit:

- Go to the [Extreme Portal](#).
- Select **Asset > Licenses Home**.
- Select **License Transfer**.
- Enter the serial numbers of the defective unit and the replacement unit, and the RMA/case number.

Displaying the Installed License Levels and Feature Licenses

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

Factory Default (Evaluation) License for Universal Hardware Switches

New universal hardware switches include a Factory Default (Evaluation) License to use all features (excluding MACsec). This Evaluation license is equivalent to a Premier license. You can configure all features, except MACsec, without restrictions and save the configuration.

The evaluation period is 30 days. If after 30 days you have not obtained and installed a Premier license (see [Obtaining and Installing Licenses](#) on page 10) and you reboot the switch, the switch will effectively have only Base license (see [Table 4](#) on page 9) capabilities.



Note

The ExtremeSwitching 5320 series includes an additional Factory Default 4-port 10G Evaluation license. This license allows you to activate the last four SFP+ ports for 10G Ethernet uplink.

To extend the evaluation period, you can use the following commands:

To enable a trial license, issue the command `debug epm enable trial-license`.

To clear a trial license, issue the command `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

[Base License Features](#) on page 13

[Premier License Features](#) on page 16

Base License Features

The Base License includes the features in the following table:

Table 5: Switch Engine Base License Features

Switch Engine Software Feature	Supported Platforms
AVB <ul style="list-style-type: none"> Generalized Precision Time Protocol (GPTP) Multiple VLAN Registration Protocol (MVRP) Multiple Stream Registration Protocol (MSRP) Platform Support 	All platforms. Universal platforms 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	All platforms
BGP peers—Universal switches are allowed up to 2 manually configured BGP peers on the default VR with a base license.	All platforms
CLEARFlow	All platforms
Convergence End Point (CEP) detection	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

Table 5: Switch Engine Base License Features (continued)

Switch Engine Software Feature	Supported 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
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
Extended Edge Switching	ExtremeSwitching 5420 and 5520
Extreme Network Virtualization (XNV)	All platforms except 5320
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)	Not supported
IP NAT	Not supported
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
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 Switch Engine 32.1 User Guide .	All platforms
IPv4 Duplicate Address Detection (DAD)	All platforms
IPv6 unicast routing, including static routes	All platforms
IPv6 interworking—IPv6-to-IPv4 and IPv6-in-IPv4 configured tunnels	All platforms
IPv6 DAD without CLI management	All platforms
IPv6 DAD with CLI management	All platforms

Table 5: Switch Engine Base License Features (continued)

Switch Engine Software Feature	Supported Platforms
Keychain Manager	All platforms
Local-only, user-created virtual routers (VR)	ExtremeSwitching 5320-24T/24P
Multi-Switch Link Aggregation Group (MLAG)	All platforms
Multinetting for forwarding	All platforms
ONEPolicy	All platforms
OSPFv2-Edge (limited to max of 4 active interfaces)	All platforms
OSPFv2 Auto-peering	All platforms
OSPFv3-Edge (limited to max of 4 active interfaces)	All platforms
PIM—Universal switches are not subject to the maximum number of PIM IPv4 interfaces (4) that pertains to other switch models.	All platforms
PIM-SM-Edge	All platforms
PIM snooping Note: This feature has limitations in the Base license. See the Switch Engine 32.1 User Guide .	All platforms
Policy based routing (PBR) for IPv4	All platforms
Policy based routing (PBR) for IPv6	All platforms
Protocol-based VLANs	All platforms
PSTag	ExtremeSwitching 5420 and 5520.
Python scripting	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)	Not supported
SummitStack-V (switch stacking using dual-purpose data ports)	All platforms. See the specific models listed in the "Support for Alternate Stacking Ports" section of the Switch Engine 32.1 User Guide .
SyncE	Not supported
System virtual routers (VRs)	All platforms
UDP Forwarding	All platforms
UDP BootP relay forwarding	All platforms
User-created virtual routers (VRs) Virtual router and forwarding (VRF)	ExtremeSwitching 5320-48T/48P, 5420, 5520, 5720

Table 5: Switch Engine Base License Features (continued)

Switch Engine Software Feature	Supported Platforms
VLAN aggregation	All platforms
VRRP	All platforms
VXLAN	All platforms

Premier License Features

The Premier License includes the features in the following table:

Table 6: Switch Engine Premier License Features

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



Feature Licenses

[MPLS Feature License](#) on page 20

[MAC Security Feature License](#) on page 21

[Optics XMOD](#) on page 21

The Switch Engine software features are listed in the following table are managed as feature licenses. Feature licenses are distributed in one of the following forms:

- **In Switch Engine software** (standard software component)—You must purchase a license to use the feature.
- **Modular software package** (XMOD file, so named because of its .xmod file extension)—You must request the XMOD file from your supplier and install it.

For feature license and installation instructions, see *Installing a Modular Software Package* in the *Switch Engine 32.1 User Guide*.



Note

Secure Shell 2 (SSH2) is not provided as a feature license. It is incorporated into the main Switch Engine software image and is not 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 Switch Engine 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 *Switch Engine 32.1 User Guide*.

For more information on SSH2, see *Using Secure Shell 2* in the *Switch Engine 32.1 User Guide*.

Table 7: Switch Engine Feature Licenses

Feature License	Feature	Platform support	XMOD Required
MPLS Feature License See MPLS Feature License on page 20.	<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 5520 series switches.	No
AVB Feature License	<ul style="list-style-type: none"> • Generalized Precision Time Protocol (GPTP) • Multiple VLAN Registration Protocol (MVRP) • Multiple Stream Registration Protocol (MSRP) • Platform Support 	All platforms. All Universal Hardware platforms 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.	No

Table 7: Switch Engine Feature Licenses (continued)

Feature License	Feature	Platform support	XMOD Required
MAC Security License See MAC Security Feature License on page 21.	MAC Security licensing.	See MACsec Platform Support on page 19	No
ExtremeCloud™ IQ Agent	ExtremeCloud IQ provides device discovery, basic monitoring, visibility into homogenous stacking, ability to configure an optional user-defined VR and address of the server for to connect to. For more information about ExtremeCloud IQ, go to https://www.extremenetworks.com/extremecloud-iq/ .	See ExtremeCloud IQ Agent Support	Yes

MACsec Platform Support

Table 8: MACsec Supported Platforms

Platform	Ports	LRM/ MACsec Adapter Required?
ExtremeSwitching 5320	All ports of all models except stacking ports.	No
ExtremeSwitching 5420	All ports of all models except stacking ports.	No
ExtremeSwitching 5520	All ports, except 5520-VIM-4X and 24X 10G ports	No
ExtremeSwitching 5720	All ports of all models except stacking ports.	No

ExtremeCloud IQ Platform Support

Table 9: Supported Platforms

Switch Series	Switch Models
ExtremeSwitching 5320	5320-48T-8XE 5320-48P-8XE 5320-24T-8XE 5320-24P-8XE 5320-16P-4XE 5320-16P-4XE-DC
ExtremeSwitching 5420	5420F-8W-16P-4XE 5420F-24P-4XE 5420F-24S-4XE 5420F-24T-4XE 5420F-16MW-32P-4XE 5420F-16W-32P-4XE 5420F-48P-4XE 5420F-48P-4XL 5420F-48T-4XE 5420M-24T-4YE 5420M-24W-4YE 5420M-16MW-32P-4YE 5420M-48T-4YE 5420M-48W-4YE
ExtremeSwitching 5520	5520-24T 5520-24W 5520-48T 5520-48W 5520-12MW-36W 5520-24X 5520-48SE
ExtremeSwitching 5720	5720-24MW 5720-24MXW 5720-48MW 5720-48MXW

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.



Note

ExtremeSwitching 5520 series switches have the MPLS Feature set included in the Premier License. You do not need to separately purchase and install the MPLS Feature License for these switches.

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.

MAC Security Feature License

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

Slot-based MACsec licenses have the following behaviors:

Table 10: 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 Switch Engine 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 Switch Engine release.