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# Installation and Upgrade on EX2300, EX3400, and EX4300 Switches

Release

15.1



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Release 15.1  
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## Documentation and Release Notes

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To obtain the most current version of all Juniper Networks<sup>®</sup> technical documentation, see the product documentation page on the Juniper Networks website at <http://www.juniper.net/techpubs/>.

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## Supported Platforms

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For the features described in this document, the following platforms are supported:

- EX Series

## Using the Examples in This Manual

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If you want to use the examples in this manual, you can use the **load merge** or the **load merge relative** command. These commands cause the software to merge the incoming configuration into the current candidate configuration. The example does not become active until you commit the candidate configuration.

If the example configuration contains the top level of the hierarchy (or multiple hierarchies), the example is a *full example*. In this case, use the **load merge** command.

If the example configuration does not start at the top level of the hierarchy, the example is a *snippet*. In this case, use the **load merge relative** command. These procedures are described in the following sections.

## Merging a Full Example

To merge a full example, follow these steps:

1. From the HTML or PDF version of the manual, copy a configuration example into a text file, save the file with a name, and copy the file to a directory on your routing platform.

For example, copy the following configuration to a file and name the file **ex-script.conf**. Copy the **ex-script.conf** file to the **/var/tmp** directory on your routing platform.

```
system {
  scripts {
    commit {
      file ex-script.xml;
    }
  }
}
interfaces {
  fxp0 {
    disable;
    unit 0 {
      family inet {
        address 10.0.0.1/24;
      }
    }
  }
}
```

2. Merge the contents of the file into your routing platform configuration by issuing the **load merge** configuration mode command:

```
[edit]
user@host# load merge /var/tmp/ex-script.conf
load complete
```

## Merging a Snippet

To merge a snippet, follow these steps:

1. From the HTML or PDF version of the manual, copy a configuration snippet into a text file, save the file with a name, and copy the file to a directory on your routing platform.

For example, copy the following snippet to a file and name the file **ex-script-snippet.conf**. Copy the **ex-script-snippet.conf** file to the **/var/tmp** directory on your routing platform.

```
commit {
  file ex-script-snippet.xml; }
```

2. Move to the hierarchy level that is relevant for this snippet by issuing the following configuration mode command:

```
[edit]
user@host# edit system scripts
[edit system scripts]
```

3. Merge the contents of the file into your routing platform configuration by issuing the **load merge relative** configuration mode command:

```
[edit system scripts]
user@host# load merge relative /var/tmp/ex-script-snippet.conf
load complete
```

For more information about the **load** command, see [CLI Explorer](#).

## Documentation Conventions

[Table 1 on page xi](#) defines notice icons used in this guide.

Table 1: Notice Icons

Icon	Meaning	Description
	Informational note	Indicates important features or instructions.
	Caution	Indicates a situation that might result in loss of data or hardware damage.
	Warning	Alerts you to the risk of personal injury or death.
	Laser warning	Alerts you to the risk of personal injury from a laser.
	Tip	Indicates helpful information.
	Best practice	Alerts you to a recommended use or implementation.

[Table 2 on page xi](#) defines the text and syntax conventions used in this guide.

Table 2: Text and Syntax Conventions

Convention	Description	Examples
<b>Bold text like this</b>	Represents text that you type.	To enter configuration mode, type the <b>configure</b> command:  user@host> <b>configure</b>

Table 2: Text and Syntax Conventions (*continued*)

Convention	Description	Examples
Fixed-width text like this	Represents output that appears on the terminal screen.	user@host> <b>show chassis alarms</b>  No alarms currently active
<i>Italic text like this</i>	<ul style="list-style-type: none"><li>Introduces or emphasizes important new terms.</li><li>Identifies guide names.</li><li>Identifies RFC and Internet draft titles.</li></ul>	<ul style="list-style-type: none"><li>A policy <i>term</i> is a named structure that defines match conditions and actions.</li><li><i>Junos OS CLI User Guide</i></li><li>RFC 1997, <i>BGP Communities Attribute</i></li></ul>
<i>Italic text like this</i>	Represents variables (options for which you substitute a value) in commands or configuration statements.	Configure the machine's domain name:  [edit] root@# <b>set system domain-name</b> <i>domain-name</i>
Text like this	Represents names of configuration statements, commands, files, and directories; configuration hierarchy levels; or labels on routing platform components.	<ul style="list-style-type: none"><li>To configure a stub area, include the <b>stub</b> statement at the [edit protocols ospf area area-id] hierarchy level.</li><li>The console port is labeled <b>CONSOLE</b>.</li></ul>
< > (angle brackets)	Encloses optional keywords or variables.	<b>stub &lt;default-metric <i>metric</i>&gt;;</b>
(pipe symbol)	Indicates a choice between the mutually exclusive keywords or variables on either side of the symbol. The set of choices is often enclosed in parentheses for clarity.	<b>broadcast   multicast</b>  <b>(<i>string1</i>   <i>string2</i>   <i>string3</i>)</b>
# (pound sign)	Indicates a comment specified on the same line as the configuration statement to which it applies.	<b>rsvp { # Required for dynamic MPLS only</b>
[ ] (square brackets)	Encloses a variable for which you can substitute one or more values.	<b>community name members [</b> <i>community-ids</i> <b>]</b>
Indentation and braces ( { } )	Identifies a level in the configuration hierarchy.	[edit] routing-options { static { route default { nexthop <i>address</i> ; retain; } } }
;(semicolon)	Identifies a leaf statement at a configuration hierarchy level.	
<b>GUI Conventions</b>		
<b>Bold text like this</b>	Represents graphical user interface (GUI) items you click or select.	<ul style="list-style-type: none"><li>In the Logical Interfaces box, select <b>All Interfaces</b>.</li><li>To cancel the configuration, click <b>Cancel</b>.</li></ul>

Table 2: Text and Syntax Conventions (*continued*)

Convention	Description	Examples
> (bold right angle bracket)	Separates levels in a hierarchy of menu selections.	In the configuration editor hierarchy, select <b>Protocols&gt;Ospf</b> .

## Documentation Feedback

We encourage you to provide feedback, comments, and suggestions so that we can improve the documentation. You can provide feedback by using either of the following methods:

- Online feedback rating system—On any page of the Juniper Networks TechLibrary site at <http://www.juniper.net/techpubs/index.html>, simply click the stars to rate the content, and use the pop-up form to provide us with information about your experience. Alternately, you can use the online feedback form at <http://www.juniper.net/techpubs/feedback/>.
- E-mail—Send your comments to [techpubs-comments@juniper.net](mailto:techpubs-comments@juniper.net). Include the document or topic name, URL or page number, and software version (if applicable).

## Requesting Technical Support

Technical product support is available through the Juniper Networks Technical Assistance Center (JTAC). If you are a customer with an active J-Care or Partner Support Service support contract, or are covered under warranty, and need post-sales technical support, you can access our tools and resources online or open a case with JTAC.

- JTAC policies—For a complete understanding of our JTAC procedures and policies, review the *JTAC User Guide* located at <http://www.juniper.net/us/en/local/pdf/resource-guides/7100059-en.pdf>.
- Product warranties—For product warranty information, visit <http://www.juniper.net/support/warranty/>.
- JTAC hours of operation—The JTAC centers have resources available 24 hours a day, 7 days a week, 365 days a year.

## Self-Help Online Tools and Resources

For quick and easy problem resolution, Juniper Networks has designed an online self-service portal called the Customer Support Center (CSC) that provides you with the following features:

- Find CSC offerings: <http://www.juniper.net/customers/support/>
- Search for known bugs: <http://www2.juniper.net/kb/>
- Find product documentation: <http://www.juniper.net/techpubs/>
- Find solutions and answer questions using our Knowledge Base: <http://kb.juniper.net/>

- Download the latest versions of software and review release notes:  
<http://www.juniper.net/customers/csc/software/>
- Search technical bulletins for relevant hardware and software notifications:  
<http://kb.juniper.net/InfoCenter/>
- Join and participate in the Juniper Networks Community Forum:  
<http://www.juniper.net/company/communities/>
- Open a case online in the CSC Case Management tool: <http://www.juniper.net/cm/>

To verify service entitlement by product serial number, use our Serial Number Entitlement (SNE) Tool: <https://tools.juniper.net/SerialNumberEntitlementSearch/>

## Opening a Case with JTAC

You can open a case with JTAC on the Web or by telephone.

- Use the Case Management tool in the CSC at <http://www.juniper.net/cm/>.
- Call 1-888-314-JTAC (1-888-314-5822 toll-free in the USA, Canada, and Mexico).

For international or direct-dial options in countries without toll-free numbers, see <http://www.juniper.net/support/requesting-support.html>.

## CHAPTER 1

# Junos Software Overview

- [Understanding Software Infrastructure and Processes on page 15](#)
- [Junos OS Package Names for EX Series Switches on page 17](#)

## Understanding Software Infrastructure and Processes

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Each switch runs the Juniper Networks Junos operating system (Junos OS) for Juniper Networks EX Series Ethernet Switches on its general-purpose processors. Junos OS includes processes for Internet Protocol (IP) routing and for managing interfaces, networks, and the chassis.

The Junos OS runs on the Routing Engine. The Routing Engine kernel coordinates communication among the Junos OS processes and provides a link to the Packet Forwarding Engine.

With the J-Web interface and the command-line interface (CLI) to the Junos OS, you configure switching features and routing protocols and set the properties of network interfaces on your switch. After activating a software configuration, use either the J-Web or CLI user interface to monitor the switch, manage operations, and diagnose protocol and network connectivity problems.

- [Routing Engine and Packet Forwarding Engine on page 15](#)
- [Junos OS Processes on page 16](#)

## Routing Engine and Packet Forwarding Engine

A switch has two primary software processing components:

- **Packet Forwarding Engine**—Processes packets; applies filters, routing policies, and other features; and forwards packets to the next hop along the route to their final destination.
- **Routing Engine**—Provides three main functions:
  - Creates the packet forwarding switch fabric for the switch, providing route lookup, filtering, and switching on incoming data packets, then directing outbound packets to the appropriate interface for transmission to the network
  - Maintains the routing tables used by the switch and controls the routing protocols that run on the switch.

- Provides control and monitoring functions for the switch, including controlling power and monitoring system status.

## Junos OS Processes

The Junos OS running on the Routing Engine and Packet Forwarding Engine consists of multiple processes that are responsible for individual functions.

The separation of functions provides operational stability, because each process accesses its own protected memory space. In addition, because each process is a separate software package, you can selectively upgrade all or part of the Junos OS, for added flexibility.

[Table 3 on page 16](#) describes the primary Junos OS processes.

**Table 3: Junos OS Processes**

Process	Name	Description
Chassis process	chassisd	<p>Detects hardware on the system that is used to configure network interfaces.</p> <p>Monitors the physical status of hardware components and field-replaceable units (FRUs), detecting when environment sensors such as temperature sensors are triggered.</p> <p>Relays signals and interrupts—for example, when devices are taken offline, so that the system can close sessions and shut down gracefully.</p>
Ethernet switching process	eswd	<p>Handles Layer 2 switching functionality such as MAC address learning, Spanning Tree protocol and access port security. The process is also responsible for managing Ethernet switching interfaces, VLANs, and VLAN interfaces.</p> <p>Manages Ethernet switching interfaces, VLANs, and VLAN interfaces.</p>
Forwarding process	pfem	<p>Defines how routing protocols operate on the switch. The overall performance of the switch is largely determined by the effectiveness of the forwarding process.</p>
Interface process	dcd	<p>Configures and monitors network interfaces by defining physical characteristics such as link encapsulation, hold times, and keepalive timers.</p>
Management process	mgd	<p>Provides communication between the other processes and an interface to the configuration database.</p> <p>Populates the configuration database with configuration information and retrieves the information when queried by other processes to ensure that the system operates as configured.</p> <p>Interacts with the other processes when commands are issued through one of the user interfaces on the switch.</p> <p>If a process terminates or fails to start when called, the management process attempts to restart it a limited number of times to prevent thrashing and logs any failure information for further investigation.</p>
Routing protocol process	rpd	<p>Defines how routing protocols such as RIP, OSPF, and BGP operate on the device, including selecting routes and maintaining forwarding tables.</p>



Related  
Documentation

## Junos OS Package Names for EX Series Switches

You upgrade the Juniper Networks Junos operating system (Junos OS) on a Juniper Networks EX Series Ethernet Switch by copying a software package to your switch or another system on your local network, then install the new software package on the switch.

Two versions of a Junos OS image—a controlled version that supports Media Access Control Security (MACsec) and a domestic version that does not support MACsec—are available for EX Series switches. A domestic version of Junos OS is available for all EX Series switches; a controlled version of Junos OS is only available for EX Series switches on Junos OS releases that support MACsec. The domestic version of Junos OS on EX Series switches can be used on any switch in any geography. The controlled version of Junos OS contains encryption and is not available to customers in all geographies.



**NOTE:** The controlled version of Junos OS contains encryption and is, therefore, not available to customers in all geographies. The export and re-export of the controlled version of Junos OS is strictly controlled under United States export laws. The export, import, and use of the controlled version of Junos OS is also subject to controls imposed under the laws of other countries.

If you have questions about acquiring the controlled version of Junos OS in your country, contact the Juniper Networks Trade Compliance group at [compliance\\_helpdesk@juniper.net](mailto:compliance_helpdesk@juniper.net).



**NOTE:** The domestic version of Junos OS on EX Series switches is intended for use on any switch in any worldwide location.

For most Junos packages on other Juniper Networks products, the domestic package is used for products installed in the United States and Canada only while an export package is used for products installed in any worldwide location.

**domestic-signed** indicates the domestic software package.

A domestic software package name is in the following format:

***package-name-m.nZx.y-domestic-signed.tgz***

A controlled software package name is in the following format:

***package-name-m.nZx.y-controlled-signed.tgz***

where:

- **package-name** is the name of the package—for example, **jinstall-ex-4200**.
- **m.n** is the software release, with **m** representing the major release number and **n** representing the minor release number—for example, **9.5**.
- **Z** indicates the type of software release, where **R** indicates released software and **B** indicates beta-level software.
- **x.y** represents the version of the major software release (**x**) and an internal tracking number (**y**)—for example, **1.6**.
- **domestic-signed** indicates the domestic software package.
- **controlled-signed** indicates the controlled software package.

A sample EX Series software domestic package name is:

`jinstall-ex-4200-9.5R1.6-domestic-signed.tgz`

A sample EX Series controlled package name is:

`jinstall-ex-4200-13.2X50-D15.3-controlled-signed.tgz`

**Related  
Documentation**

- [Installing Software on EX Series Switches \(J-Web Procedure\) on page 51](#)
- [Installing Software on an EX Series Switch with a Single Routing Engine \(CLI Procedure\) on page 44](#)
- [Installing Software on an EX Series Switch with Redundant Routing Engines \(CLI Procedure\) on page 46](#)
- [Downloading Software Packages from Juniper Networks on page 43](#)
- [Understanding Software Installation on EX Series Switches on page 28](#)

## PART 1

# Installing Junos Software

- [Software Installation Overview on page 21](#)
- [Installing Software on page 37](#)
- [Junos OS With Upgraded FreeBSD for EX2300 and EX3400 Switches on page 63](#)



## CHAPTER 2

# Software Installation Overview

- [Understanding Zero Touch Provisioning on page 21](#)
- [Understanding Software Installation on EX Series Switches on page 28](#)
- [Understanding System Snapshot on EX Series Switches on page 31](#)
- [Understanding Resilient Dual-Root Partitions on Switches on page 32](#)

## Understanding Zero Touch Provisioning

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- [Understanding Zero Touch Provisioning on page 21](#)
- [Zero Touch Provisioning Process on page 23](#)
- [Zero Touch Provisioning Restart Process Triggers on page 26](#)

## Understanding Zero Touch Provisioning



**NOTE:** To see which platforms support Zero Touch Provisioning (ZTP) in a browser, go to [Feature Explorer](#). In the Explore Features section of the Feature Explorer page, select All Features. In the Features Grouped by Feature Family box, select Zero Touch Provisioning. You can also type the name of the feature in the Search for Features edit box. In previous Junos OS releases on EX Series switches, ZTP was called EZ Touchless Provisioning.



**NOTE:** QFX5200 switches only work with HTTP in 15.1X53-D30. FTP and TFTP protocols are not supported.

ZTP allows you to provision new Juniper Networks switches in your network automatically, without manual intervention. When you physically connect a switch to the network and boot it with a default factory configuration, it attempts to upgrade the Junos OS software automatically and autoinstall a configuration file from the network.

The switch uses information that you configure on a Dynamic Host Configuration Protocol (DHCP) server to locate the necessary software image and configuration files on the network. If the DHCP server does not respond or provide the software image and configuration files, the switch boots with the preinstalled software and default factory configuration. On switches running Enhanced Layer 2 Software, Junos Extended Dynamic

Host Configuration Protocol (JDHCP) is used instead of legacy DHCP. JDHCP supports the same functionality as DHCP, and all configuration options remain the same. JDHCP is an enhanced version of legacy DHCP software.



**NOTE:** For detailed information regarding the DHCP and DHCP options, refer to RFC2131 (<http://www.ietf.org/rfc/rfc2131.txt> ) and RFC2132 ([www.ietf.org/rfc/rfc2132.txt](http://www.ietf.org/rfc/rfc2132.txt)). Also, this document refers to Internet Systems Consortium (ISC) DHCP version 4.2. For more information regarding this version, refer to <http://www.isc.org/software/dhcp/documentation>.

The Zero Touch Provisioning process will either upgrade or downgrade the Junos OS version. During a downgrade:

- On an EX Series switch, If you downgrade to a software version earlier than Junos OS Release 12.2, in which ZTP is not supported, the configuration file autoinstall phase of the Zero Touch Provisioning process does not happen.
- On an EX Series switch, to downgrade to a software version that does not support resilient dual-root partitions (Junos OS Release 10.4R2 or earlier), you must perform some manual work on the switch. For more information, see “[Understanding Resilient Dual-Root Partitions on Switches](#)” on page 32.



**NOTE:** On QFX3500 and QFX3600 switches running the original CLI, you cannot use ZTP to upgrade from Junos OS Release 12.2 or later to Junos OS Release 13.2X51-D15 or later.

## Zero Touch Provisioning Process

When you boot a switch with the default factory configuration, the following process happens:



**NOTE:** If you are performing Zero Touch Provisioning (ZTP) with a Junos OS image that contains enhanced automation for the QFX5100 switch, configure root authentication, and the provider name, license type, and deployment scope for Chef and Puppet at the [edit system] hierarchy in the configuration file that is fetched from the server:

```
{master:0}
root# set root-authentication (encrypted-password password | plain-text-password
password | ssh-dsa public-key | ssh-rsa public-key)
root# set extensions providers juniper license-type customer deployment-scope
commercial
root# set extensions providers chef license-type customer deployment-scope
commercial
```

1. If DHCP option 43, suboption 00 (the name of the software image file on the FTP, HTTP, or TFTP server) is configured, the switch compares the version of the provided software image to the version of the software installed on the switch.



**NOTE:** When the DHCP server cannot use suboption 00, configure the image file using suboption 04. If both suboption 00 and suboption 4 are defined, suboption 04 is ignored.

2. If DHCP option 43, suboption 02 (a symbolic link to the software image file on the FTP, HTTP, or TFTP server), the switch compares the version of the provided software image to the version of the software installed on the switch.
  - If the Junos OS versions are different, the switch downloads the software image from the FTP, HTTP, or TFTP server, installs the Junos OS, and reboots using the default factory configuration.
  - If the software versions are the same, the switch does not upgrade the software.
3. If DHCP option 43, suboption 01 (the name of the configuration file on the FTP, TFTP, or HTTP server) is configured:

If DHCP option 43 suboption 01 is not specified, the switch uses the default factory configuration.

If both DHCP option 43 suboption 01 and suboption 2 are specified, suboption 01 is processed before suboption 02. The Junos OS is upgraded, and then the configuration file is applied.



**NOTE:** On EX4300 and QFX5100 switches running Enhanced Layer 2 Software, and QFX5100 switches running a Junos OS image that contains enhanced automation, you can specify the name of a script file or a configuration file in suboption 01. ZTP determines if the file is a script file based on the first line that is included in the file. If the first line contains



#! characters followed by an interpreter path—for example, `#!/usr/libexec/ui/cscript`—ZTP determines that the file is a script file, and executes the script file with the specified interpreter path. If the script returns an error, ZTP will fetch the script file and execute the script file until the script executes successfully. If the file does not contain special characters or an interpreter path, ZTP determines that the file is a configuration file.

4. If DHCP option 43, suboption 03 (the transfer mode setting) is configured, the switch accesses the FTP, HTTP, or TFTP server using the specified transfer mode setting—for example, FTP.

If DHCP option 43, suboption 03, is not configured, TFTP becomes the transfer mode automatically.

5. If DHCP option 43, suboption 04 (the name of the software image file on the FTP, HTTP, or TFTP server) is configured, the switch compares the version of the provided software image to the version of the software installed on the switch.



**NOTE:** When the DHCP server cannot use suboption 00, configure the image file using suboption 04. If both suboption 00 and suboption 4 are defined, suboption 04 is ignored.



**NOTE:** DHCP option 43 suboptions 05 through 255 are reserved.

6. If DHCP option 150 or option 66 is specified, the IP address of the FTP, HTTP, or TFTP server is configured.



**NOTE:** You must configure either option 150 or option 66. If you configure both option 150 and option 66, option 150 takes precedence, and option 66 is ignored. Also, make sure you specify an IP address, not a hostname, because name resolution is not supported.

7. (Optional) If DHCP option 7 is specified, you can configure one or more system log (syslog) servers.

8. (Optional) If DHCP option 42 is specified, you can configure one or more NTP servers.
9. (Optional) If DHCP option 12 is specified, you can configure the hostname of the switch.

## Zero Touch Provisioning Restart Process Triggers

ZTP restarts when any of the following events occur:

- Request for configuration file, script file, or image file fails.
- Configuration file is incorrect, and commit fails.
- No configuration file and no image file is available.
- Image file is corrupted, and installation fails.
- No file server information is available.
- DHCP client does not have valid ZTP parameters configured.
- When none of the DHCP client interfaces goes to a bound state.
- ZTP transaction fails after six attempts to fetch configuration file or image file.

When any of these events occur, ZTP resets the DHCP client state machine on all of the DHCP client-configured interfaces (management and network) and then restarts the state machine. Restarting the state machine enables the DHCP client to get the latest DHCP server-configured parameters.

Before ZTP restarts, approximately 15 to 30 seconds must elapse to allow enough time to build a list of bound and unbound DHCP client interfaces.

The list of bound and unbound DHCP client interfaces can contain:

- No entries.
- Multiple DHCP client interfaces.

Priority is given to the DHCP client interfaces that have received all ZTP parameters (software image file, configuration file, and file server information) from the DHCP server.

After the lists of bound and unbound client interfaces are created, and a DHCP client gets selected for ZTP activity, then any existing default route is deleted, and the DHCP client interface that was selected adds a new default route. In order to add a new default route, only one ZTP instance can be active.

After ZTP restarts, the DHCP client attempts fetching files from the DHCP server for up to six times, with ten to fifteen seconds elapsing between attempts. Every attempt, whether successful or not, is logged and can be seen on the console.

If there is a failure, or the number of attempts exceeds the limit, ZTP stops. ZTP then clears the DHCP client bindings and restarts state machine on the DHCP-configured interfaces.

The ZTP restart process continues until there is either a successful software upgrade, or an operator manually commits a user configuration and deletes the ZTP configuration.

**Related  
Documentation**

- [Configuring Zero Touch Provisioning on page 38](#)
- [Monitoring Zero Touch Provisioning on page 55](#)

## Understanding Software Installation on EX Series Switches

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A Juniper Networks EX Series Ethernet Switch is delivered with the Juniper Networks Junos operating system (Junos OS) preinstalled. As new features and software fixes become available, you must upgrade your software to use them. You can also downgrade Junos OS to a previous release.

This topic covers:

- [Overview of the Software Installation Process on page 28](#)
- [Software Package Security on page 28](#)
- [Installing Software on a Virtual Chassis on page 29](#)
- [Installing Software on Switches with Redundant Routing Engines on page 29](#)
- [Installing Software Using Automatic Software Download on page 29](#)
- [Autoinstalling a Configuration File on an EX2200 or EX3300 Switch from a Disk-on-Key USB Memory Stick on page 30](#)
- [Installing Software on an EX2300 or EX3400 Switch on page 30](#)
- [Troubleshooting Software Installation on page 30](#)

### Overview of the Software Installation Process

An EX Series switch is delivered with a domestic version of Junos OS preinstalled. When you connect power to the switch, it starts (boots) from the installed software.

You upgrade Junos OS on an EX Series switch by copying a software package to your switch or another system on your local network, then use either the J-Web interface or the command-line interface (CLI) to install the new software package on the switch. Finally, you reboot the switch; it boots from the upgraded software. After a successful upgrade, you should back up the new current configuration to a secondary device. You should follow this procedure regardless of whether you are installing a domestic or controlled Junos OS package.

During a successful upgrade, the upgrade package removes all files from `/var/tmp` and completely reinstalls the existing software. It retains configuration files, and similar information, such as secure shell and host keys, from the previous version. The previous software package is preserved in a separate disk partition, and you can manually revert back to it if necessary. If the software installation fails for any reason, such as loss of power during the installation process, the system returns to the originally active installation when you reboot.

### Software Package Security

All Junos OS releases are delivered in signed packages that contain digital signatures to ensure official Juniper Networks software. For more information about signed software packages, see the [Junos OS Installation and Upgrade Guide](#).

## Installing Software on a Virtual Chassis

You can connect individual EX Series switches together to form one unit and manage the unit as a single device, called a Virtual Chassis. The Virtual Chassis operates as a single network entity composed of member switches. Each member switch in a Virtual Chassis must be running the same version of Junos OS. See *EX Series Virtual Chassis Software Features Overview* for a list of switches that can be used in a Virtual Chassis.

For ease of management, a Virtual Chassis provides flexible methods to upgrade software releases. You can deploy a new software release to all member switches of a Virtual Chassis or to only a particular member switch.

You can also upgrade the software on an EX4200, EX4500, mixed EX4200 and EX4500, and EX8200 Virtual Chassis using nonstop software upgrade (NSSU). NSSU takes advantage of graceful Routing Engine switchover (GRES) and nonstop active routing (NSR) to ensure no disruption to the control plane during the upgrade. You can minimize disruption to network traffic by defining link aggregation groups (LAGs) such that the member links of each LAG reside on different line cards (on EX8200 Virtual Chassis) or on different members (on EX4200, EX4500, mixed EX4200 and EX4500 Virtual Chassis). During an NSSU, the line cards and Virtual Chassis members are upgraded one at a time, so that traffic continues to flow through the other line cards or members while that line card or member is being upgraded.

## Installing Software on Switches with Redundant Routing Engines

You can install software on a switch with redundant Routing Engines in one of two ways:

- Perform an NSSU—An NSSU upgrades both Routing Engines with a single command and with a minimum of network disruption. An NSSU takes advantage of GRES and NSR to ensure no disruption to the control plane. You can minimize disruption to network traffic by defining LAGs such that the member links of each LAG reside on different line cards. The line cards are upgraded one at a time, so that traffic continues to flow through the other line cards while a line card is being upgraded.

You cannot use NSSU to downgrade the software running on a switch.

For more information about NSSU, see *Understanding Nonstop Software Upgrade on EX Series Switches*. See *EX Series Switch Software Features Overview* for a list of switches that support NSSU.

- Upgrade each Routing Engine manually—You can perform a Junos OS installation on each Routing Engine separately, starting with the backup Routing Engine. You can use this procedure to downgrade the software running on a switch. See [“Installing Software on an EX Series Switch with Redundant Routing Engines \(CLI Procedure\)” on page 46](#).

## Installing Software Using Automatic Software Download

The automatic software download feature uses the DHCP message exchange process to download and install software packages. Users can define a path to a software package on the DHCP server and then the DHCP server communicates this path to EX Series switches acting as DHCP clients as part of the DHCP message exchange process. The DHCP clients that have been configured for automatic software download receive these

messages and, when the software package name in the DHCP server message is different from that of the software package that booted the DHCP client switch, download and install the software package. See *Upgrading Software by Using Automatic Software Download*.

### Autoinstalling a Configuration File on an EX2200 or EX3300 Switch from a Disk-on-Key USB Memory Stick

You can use an autoinstallation process to configure the software on an EX2200 or EX3300 switch. You can use a configuration file that is in either text format or XML format. If you want to use an XML-formatted file, you use a Junos Space platform to create the configuration file. You place the configuration file on a Disk-on-Key USB memory stick.

### Installing Software on an EX2300 or EX3400 Switch

Before installing software on an EX2300 or EX3400 switch:

- Ensure that at least 620 MB of disk space is available in the system before downloading the software installation package to the `/var/tmp` directory. Use the command **show system storage** to get details of the available space.
- If the space available is inadequate, use the command **request system storage cleanup**. Additionally, you can manually delete any other log or unwanted files from the `/var/tmp` or `/var/log` directories.

You can now follow the procedure in “[Installing Software on an EX Series Switch with a Single Routing Engine \(CLI Procedure\)](#)” on page 44 to complete the software installation.

### Troubleshooting Software Installation

If Junos OS loads but the CLI is not working for any reason, or if the switch has no software installed, you can use the recovery installation procedure to install the software on the switch. See “[Troubleshooting Software Installation](#)” on page 97.



**NOTE:** You can also use this procedure to load two versions of Junos OS in separate partitions on the switch.

#### Related Documentation

- [Downloading Software Packages from Juniper Networks on page 43](#)
- [Installing Software on EX Series Switches \(J-Web Procedure\) on page 51](#)
- [Installing Software on an EX Series Switch with a Single Routing Engine \(CLI Procedure\) on page 44](#)
- [Installing Software on an EX Series Switch with Redundant Routing Engines \(CLI Procedure\) on page 46](#)
- [Understanding Nonstop Software Upgrade on EX Series Switches](#)

## Understanding System Snapshot on EX Series Switches

You can create copies of the software running a Juniper Networks EX Series Ethernet Switch using the system snapshot feature. The system snapshot feature takes a “snapshot” of the files currently used to run the switch and copies them to an alternate storage location. You can then use this snapshot to boot the switch at the next bootup or as a backup boot option.

The switch can boot from either internal flash media or external (USB) flash media. The contents of the snapshot vary depending on whether you create the snapshot on the media that the switch booted from or on the media that it did not boot from:

Snapshots are particularly useful for moving files onto USB flash drives. You cannot use the **copy** command or any other file-moving technique to move files from an internal memory source to USB memory on the switch.

- If you create the snapshot on the media that the switch did not boot from, the following partitions on the boot media are included in the snapshot: **root**, **altroot**, **var**, **var/tmp**, **config**.

The **root** partition is the primary boot partition, and the **altroot** partition is the backup boot partition.

- If you create the snapshot on the media that the switch booted from, the root partition that the switch booted from is copied to the alternate root partition. The **var**, **var/tmp**, and **config** partitions are not copied as part of the snapshot because they already exist on the boot media.

The system snapshot feature has the following limitations:

- You cannot use snapshots to move files to any destination outside the switch other than an installed external USB flash drive or switches that are members of the same Virtual Chassis as the switch on which you created the snapshot..
- Snapshot commands, like all commands executed on a Virtual Chassis, are executed on the local member switch. If different member switches request the snapshot, the snapshot command is pushed to the Virtual Chassis member creating the snapshot and is executed on that member, and the output is then returned to the switch that initiated the process. For instance, if the command to create an external snapshot on member 3 is entered on member 1, the snapshot of internal memory on member 3 is taken on external memory on member 3. The output of the process is seen on member 1. No files move between the switches.

### Related Documentation

- [Understanding Software Installation on EX Series Switches on page 28](#)
- [Creating a Snapshot and Using It to Boot an EX Series Switch on page 54](#)

## Understanding Resilient Dual-Root Partitions on Switches

Resilient dual-root partitioning, introduced on Juniper Networks EX Series Ethernet Switches in Juniper Networks Junos operating system (Junos OS) Release 10.4R3, provides additional resiliency to switches in the following ways:

- Allows the switch to boot transparently from the second (alternate) root partition if the system fails to boot from the primary root partition.
- Provides separation of the root Junos OS file system from the `/var` file system. If corruption occurs in the `/var` file system (a higher probability than in the root file system because of the greater frequency of reads and writes in `/var`), the root file system is insulated from the corruption.



**NOTE:** For instructions on upgrading to a release that supports resilient dual-root partitions from a release that does not, see the release notes. The procedure for upgrading to a resilient dual-root partition release is different from the normal upgrade procedure.

This topic covers:

- [Resilient Dual-Root Partition Scheme \(Junos OS Release 10.4R3 and Later\)](#) on page 32
- [Automatic Fixing of Corrupted Primary Root Partition with the Automatic Snapshot Feature](#) on page 33
- [Earlier Partition Scheme \(Junos OS Release 10.4R2 and Earlier\)](#) on page 34
- [Understanding Upgrading or Downgrading Between Resilient Dual-Root Partition Releases and Earlier Releases](#) on page 34

### Resilient Dual-Root Partition Scheme (Junos OS Release 10.4R3 and Later)

EX Series switches that ship with Junos OS Release 10.4R3 or later are configured with a root partition scheme that is optimized for resiliency, as shown in [Table 4 on page 32](#).

**Table 4: Resilient Dual-Root Partition Scheme**

Slice 1	Slice 2	Slice 3		Slice 4
s1a	s2a	s3e	s3d	s4d
/	/	/var	/var/tmp	/config
(root Junos OS )	(root Junos OS )			

In the resilient dual-root partition scheme, the `/var` file system is contained in a separate slice (Slice 3) from the root file systems; the `/config` directory is contained in its own slice (Slice 4); and switches ship from the factory with identical Junos OS images in Slice 1 and Slice 2. The `/var` file system, which has a greater frequency of reads and writes than the root file systems and is therefore more likely to have corruption issues, is isolated



from the root directories and the `/config` directory. If the switch fails to boot from the active partition, the switch automatically boots from the alternate root partition and triggers an alarm.

## Automatic Fixing of Corrupted Primary Root Partition with the Automatic Snapshot Feature

Resilient dual-root partitioning also provides the *automatic snapshot* feature, which allows the switch to automatically fix a corrupt Junos OS file in the primary root partition. If the automatic snapshot feature is enabled, the switch automatically takes a snapshot of the Junos OS root file system in the alternate root partition and copies it onto the primary root partition, thereby repairing the corrupt file in the primary root partition. The automatic snapshot procedure takes place whenever the system reboots from the alternate root partition, regardless of whether the reboot is due to a command or due to corruption of the primary root partition.



### NOTE:

- EX9200 switches do not support the automatic snapshot feature.
- The automatic snapshot feature is enabled by default on the following EX Series switches:
  - EX4550 switches
  - EX Series switches that ship with Junos OS Release 12.3R1 or later
- The automatic snapshot feature is disabled by default on EX Series switches (except the EX4550 switches) running Junos OS Release 12.2 or earlier.
- If the automatic snapshot feature was disabled by default before the switch was upgraded to Junos OS Release 12.3R1 or later, the feature remains disabled (for backward compatibility) by default after the upgrade.
- If the automatic snapshot feature is enabled in a Virtual Chassis configuration, the automatic snapshot procedure takes place whenever any member of the Virtual Chassis reboots from its alternate root partition.
- You can enable the automatic snapshot feature by configuring the `auto-snapshot` statement at the `[edit system]` hierarchy level.

The automatic snapshot feature provides an additional layer of fault protection if you maintain the same version of Junos OS in both partitions of resilient dual-root partitions. When **auto-snapshot** is enabled, repair happens automatically. Therefore, the switch does not issue an alarm to indicate that the system has rebooted from the alternate partition. However, it does log the event. You cannot execute a manual snapshot when an automatic snapshot procedure is in process. The login banner indicates that an automatic snapshot operation is in progress and that banner is removed only after the snapshot operation is complete. The next reboot happens from the primary partition.



**NOTE:** EX Series switches that ship with Junos OS Release 10.4R3 or later are configured with identical Junos OS images in the primary root partition (Slice 1) and the alternate root partition (Slice 2).

However, if you do *not* maintain the same version of Junos OS in both partitions, you might want to disable the automatic snapshot feature. If you have an earlier version of Junos OS in the alternate partition and the system reboots from the alternate root partition, the automatic snapshot feature causes the later Junos OS version to be replaced with the earlier version.

When automatic snapshot is disabled and the system reboots from the alternate root partition, it triggers an alarm indicating that the system has rebooted from its alternate partition.

## Earlier Partition Scheme (Junos OS Release 10.4R2 and Earlier)

The partition scheme used in Junos OS 10.4R2 and earlier is shown in [Table 5 on page 34](#).

**Table 5: Earlier Partition Scheme**

Slice 1		Slice 2		Slice 3	
s1a	s1f	s2a	s2f	s3d	s3e
/	/var	(empty until initial software upgrade)	(empty until initial software upgrade)	/var/tmp	/config
(root Junos OS)					

This is the partitioning scheme for a switch shipped with Release 10.4R2 or earlier (or after you reformat the disk during a downgrade from Release 10.4R3 or later to Release 10.4R2 or earlier). In this partitioning scheme, the switch comes from the factory with only one Junos OS image installed in the root Junos OS partition of Slice 1. The first time that you perform a software upgrade, the new Junos OS image is installed in Slice 2. If the switch fails to boot, you must manually trigger it to boot from the alternate partition (rebooting from the alternate partition does not occur automatically).

## Understanding Upgrading or Downgrading Between Resilient Dual-Root Partition Releases and Earlier Releases

Upgrading from Release 10.4R2 or earlier to Release 10.4R3 or later differs from other upgrades in two important ways:

- You must install a new loader software package in addition to installing the new Junos OS image.
- Rebooting after the upgrade reformats the disk from three partitions to four partitions. See [Table 4 on page 32](#).

You can perform all operations for this special software upgrade from the CLI.



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**CAUTION:** Back up any important log files because the `/var/log` files are not saved or restored during an upgrade from Release 10.4R2 or earlier to a release that supports resilient dual-root partitions (Release 10.4R3 or later).

We recommend that you also save your `/config` files and any important log files to an external medium because if there is a power interruption during the upgrade process, they might be lost.

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**Related  
Documentation**

- *Resilient Dual-Root Partitions Frequently Asked Questions*



## CHAPTER 3

# Installing Software

- [Configuring Zero Touch Provisioning on page 38](#)
- [Downloading Software Packages from Juniper Networks on page 43](#)
- [Installing Software on an EX Series Switch with a Single Routing Engine \(CLI Procedure\) on page 44](#)
- [Installing Software on an EX Series Switch with Redundant Routing Engines \(CLI Procedure\) on page 46](#)
- [Installing Software on EX Series Switches \(J-Web Procedure\) on page 51](#)
- [Booting an EX Series Switch Using a Software Package Stored on a USB Flash Drive on page 52](#)
- [Creating a Snapshot and Using It to Boot an EX Series Switch on page 54](#)
- [Rebooting or Halting the EX Series Switch \(J-Web Procedure\) on page 54](#)
- [Monitoring Zero Touch Provisioning on page 55](#)
- [Verifying That a System Snapshot Was Created on an EX Series Switch on page 58](#)
- [Verifying Junos OS and Boot Loader Software Versions on an EX Series Switch on page 59](#)

## Configuring Zero Touch Provisioning

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**NOTE:** To see which platforms support Zero Touch Provisioning (ZTP), in a browser, go to [Feature Explorer](#). In the Explore Features section of the Feature Explorer page, select All Features. In the Features Grouped by Feature Family box, select Zero Touch Provisioning. You can also type the name of the feature in the Search for Features edit box. In previous Junos OS releases on EX Series switches, Zero Touch Provisioning was called EZ Touchless Provisioning.

Zero Touch Provisioning allows you to provision new devices in your network automatically, without manual intervention. When you physically connect a device to the network and boot it with a default configuration, it attempts to upgrade the Junos OS software automatically and autoinstall a configuration file from the network.

The device uses information that you configure on a Dynamic Host Configuration Protocol (DHCP) server to locate the necessary software image and configuration files on the network. If the DHCP server does not respond or provide the software image and configuration files, the device continues using the preinstalled Junos OS software and default factory configuration. On switches running Enhanced Layer 2 Software, Junos Extended Dynamic Host Configuration Protocol (JDHCP) is used instead of legacy DHCP. JDHCP supports the same functionality as DHCP, and all configuration options remain the same. JDHCP is an enhanced version of legacy DHCP software. If you are performing Zero Touch Provisioning with a Junos OS image that contains enhanced automation for the QFX5100 switch, you can use DHCP option 43 suboption 01 to run script files, not just load configuration files. Using scripts, you can create device-specific configuration files, and perform HTTP request operations to web servers to download specific configuration files or Junos OS software.



**NOTE:** If the ZTP configuration is enabled, the switch broadcasts DHCP DISCOVER packets on its interfaces. If the DHCP server on the network responds with DHCP vendor options set with the necessary values to initiate ZTP, then ZTP proceeds. To disable broadcasting the DHCP DISCOVER packets without performing the ZTP process, manually delete the `auto-image-upgrade` statement located at the `[edit chassis]` hierarchy. If ZTP completes without errors, the `auto-image-upgrade` statement is automatically deleted.

Before you begin, ensure that the switch has access to the following network resources:

- A DHCP server to lease IP addresses and information on software images and configuration files on the network.

Refer to your DHCP server documentation for configuration instructions.

- The File Transfer Protocol (anonymous FTP), Hypertext Transfer Protocol (HTTP), Trivial File Transfer Protocol (TFTP) server on which the software image and configuration files are stored



**NOTE:** Although TFTP is supported, we recommend that you use FTP or HTTP instead, because these transport protocols are more reliable.

- A Domain Name System (DNS) server to perform reverse DNS lookup
- (Optional) An NTP server to perform time synchronization on the network
- (Optional) A system log (syslog) server to manage system log messages and alerts



**CAUTION:** We recommend that you do not commit a user configuration while the device is performing ZTP activity—for example, updating the software image or applying a configuration file.

Perform the following steps to configure ZTP:

1. Boot the device.

The device continues to use the preinstalled Junos OS software and default factory configuration.

2. Issue the **request system zeroize** command on the device.
3. Download the software image file and the configuration file to the FTP, HTTP, TFTP server that the device will download these files from.

You can download either one or both of these files.



**NOTE:** If you are performing Zero Touch Provisioning with a Junos OS image that contains enhanced automation for the QFX5100 device, configure root authentication, and the provider name, license type, and deployment scope for Chef and Puppet at the [edit system] hierarchy in the configuration file that is fetched from the server:

```
{master:0}
root# set root-authentication (encrypted-password password |
plain-text-password password | ssh-dsa public-key | ssh-rsa public-key)
root# set extensions providers juniper license-type customer deployment-scope
commercial
root# set extensions providers chef license-type customer deployment-scope
commercial
```

4. Configure the DHCP server to provide the necessary information to the device.

Configure IP address assignment.

You can configure dynamic or static IP address assignment for the device's management address. To determine the device's management MAC address for static IP address mapping, add 1 to the last byte of the device's MAC address, which you noted before you began this procedure.

5. Define the format of the vendor-specific information for DHCP option 43 in the dhcpd.conf file.

Here is an example of an ISC DHCP 4.2 server `dhcpd.conf` file:

```
option space NEW_OP; option;
option NEW_OP.image-file-name code 0 = text;
option NEW_OP.config-file-name code 1 = text;
option NEW_OP.image-file-type code 2 = text;
option NEW_OP.transfer-mode code 3 = text;
option NEW_OP.alt-image-file-name code 4 = text;
option NEW_OP-encapsulation code 43 = encapsulate NEW_OP;
```

6. Configure the following DHCP option 43 suboptions:

- Suboption 00: The name of the software image file to install



**NOTE:** When the DHCP server cannot use suboption 00, configure the image file using suboption 04. If both suboption 00 and suboption 4 are defined, suboption 04 is ignored.

```
option NEW_OP.image-file-name
"/dist/images/jinstall-ex-4300-13.2R1.1-domestic-signed.tgz";
```

- Suboption 01: The name of the configuration file to install



**NOTE:** On EX4300 and QFX5100 devices running Enhanced Layer 2 Software, and QFX5100 devices running a Junos OS image that contains enhanced automation, you can specify the name of a script file or a configuration file. ZTP determines if the file is a script file based on the first line that is included in the file. If the first line contains `#!` characters followed by an interpreter path, ZTP determines that the file is a script file, and executes the script file with the specified interpreter path. In order for a script to execute, the script file must provide the ability to fetch and load a valid configuration file on the device during the ZTP process.

The following list provides the types of scripts and their associated interpreter paths:

- Shell script interpreter path: `#!/bin/sh`
- SLAX script interpreter path: `#!/usr/libexec/ui/cscript`
- Python script interpreter path: `#!/usr/bin/python`

Unsigned Python scripts are only supported on limited platforms, such as the QFX5100 device. If you try to execute unsigned Python scripts on devices that do not provide support, error messages will be issued.

If the file does not contain special characters (`#!`), ZTP determines that the file is a configuration file and loads the configuration file.

```
option NEW_OP.config-file-name "/dist/config/jn-switch35.config";
```



- Suboption 02: The symbolic link to the software image file to install

```
option NEW_OP.image-file-type "symlink";
```



**NOTE:** If you do not specify suboption 2, the Zero Touch Provisioning process handles the software image as a filename, not a symbolic link.

- Suboption 03: The transfer mode that the device uses to access the TFTP/FTP/HTTP server

```
option NEW_OP.transfer-mode "ftp";
```



**NOTE:** If suboption 03 is not configured, TFTP becomes the transfer mode by default.

- Suboption 04: The name of the software image file to install



**NOTE:** When the DHCP server cannot use suboption 00, configure the image file using suboption 04. If both suboption 00 and suboption 4 are defined, suboption 04 is ignored.



**NOTE:** DHCP option 43 suboptions 05 through 255 are reserved.

```
option NEW_OP.alt-image-file-name
"/dist/images/jinstall-ex-4300-13.2R1.1-domestic-signed.tgz";
```

7.



**NOTE:** You must configure either option 150 or option 66. If you configure both option 150 and option 66, option 150 takes precedence, and option 66 is ignored. Also, make sure you specify an IP address, not a hostname, because name resolution is not supported.

Configure DHCP option 150 to specify the IP address of the FTP, HTTP, or TFTP server.

```
option option-150 code 150 "10.100.31.71";
```

8. Configure DHCP option 66 to specify the IP address of the FTP, HTTP, or TFTP server.

```
option tftp-server-name "10.100.31.71";
```

9. (Optional) Configure DHCP option 7 to specify one or more system log (syslog) servers.

```
option log-servers 10.100.31.72;
```

10. (Optional) Configure DHCP option 42 to specify one or more NTP servers.

```
option ntp-servers 10.100.31.73;
```

11. (Optional) Configure DHCP option 12 to specify the hostname of the device.

```
option hostname "switch35";
```

The following sample configuration shows the DHCP options you just configured:

```
host switch35 {
  hardware ethernet ac:4b:c8:29:5d:02;
  fixed-address 10.100.31.36;
  option tftp-server-name "10.100.31.71";
  option host-name "switch35";
  option log-servers 10.100.31.72;
  option ntp-servers 10.100.31.73;
  option NEW_OP.image-file-name
    "/dist/images/jinstall-ex-4300-13.2R1.1-domestic-signed.tgz";
  option NEW_OP.transfer-mode "ftp";
  option NEW_OP.config-file-name "/dist/config/switch35.config";
}
```

Based on the DHCP options you just configured, the following statements are appended to the Junos OS configuration file (for example, **switch35.config**):

```
system {
  host-name switch35;
  syslog {
    host 10.100.31.72 {
      any any;
    }
  }
  ntp {
    server 10.100.31.73;
  }
}
```

12. Connect the device to the network that includes the DHCP server and the FTP, HTTP, or TFTP server.
13. Boot the device with the default configuration.
14. Monitor the ZTP process by looking at the following log files.



**NOTE:** When SLAX (live operating system based on Linux) scripts are issued, the **op-script.log** and **event-script.log** files are produced.

---

- /var/log/dhcp\_logfile
- /var/log/event-script.log
- /var/log/image\_load\_log
- /var/log/messages
- /var/log/op-script.log
- /var/log/script\_output

You can also monitor the ZTP process by looking at error messages and issuing operational commands. See [“Monitoring Zero Touch Provisioning” on page 55](#) for more information.

- Related Documentation**
- [Understanding Zero Touch Provisioning on page 21](#)
  - *Understanding NTP Time Servers*
  - *Op Script Overview*
  - [Monitoring Zero Touch Provisioning on page 55](#)
  - *Understanding DHCP Services for Switches*
  - *Reverting to the Default Factory Configuration by Using the request system zeroize Command*

---

## Downloading Software Packages from Juniper Networks

You can download Junos OS packages from the Juniper Networks website to upgrade software on your EX Series switch.

Before you begin to download software upgrades, ensure that you have a Juniper Networks Web account and a valid support contract. To obtain an account, complete the registration form at the Juniper Networks website: <https://www.juniper.net/registration/Register.jsp>.

To download software upgrades from Juniper Networks:

1. Using a Web browser, follow the links to the download URL on the Juniper Networks webpage. For EX Series, there are not separate software packages for Canada the U.S. and other locations. Therefore, select **Canada and U.S. Version** regardless of your location:
  - <https://www.juniper.net/support/downloads/junos.html>
2. Log in to the Juniper Networks authentication system using the username (generally your e-mail address) and password supplied by Juniper Networks representatives.
3. Using the J-Web interface or the CLI, select the appropriate software package for your application. See [“Junos OS Package Names for EX Series Switches” on page 17](#).
4. Download the software to a local host or to an internal software distribution site.

- Related Documentation**
- [Installing Software on EX Series Switches \(J-Web Procedure\) on page 51](#)
  - [Installing Software on an EX Series Switch with a Single Routing Engine \(CLI Procedure\) on page 44](#)
  - [Understanding Software Installation on EX Series Switches on page 28](#)

## Installing Software on an EX Series Switch with a Single Routing Engine (CLI Procedure)

You can use this procedure to upgrade Junos OS on a single routing engine in any EX Series switch, including all switches that do not support redundant Routing Engines. You can also use this procedure to upgrade software on all EX Series Virtual Chassis, with the exception of the EX8200 Virtual Chassis.

This procedure can be used to upgrade the following switches or Virtual Chassis:

- EX2200 switch
- EX2300 switch
- EX3200 switch
- EX3300 switch
- EX3400 switch
- EX4200 switch
- EX4300 switch
- EX4500 switch
- EX4550 switch
- EX6200 switch (single Routing Engine upgrade only)
- EX8200 switch (single Routing Engine upgrade only)
- All Virtual Chassis except EX8200 Virtual Chassis

To upgrade software on an EX6200 or EX8200 switch running two Routing Engines, see [“Installing Software on an EX Series Switch with Redundant Routing Engines \(CLI Procedure\)” on page 46](#) or *Upgrading Software on an EX6200 or EX8200 Standalone Switch Using Nonstop Software Upgrade (CLI Procedure)*.

To upgrade software on an EX8200 Virtual Chassis, see *Installing Software for All Devices in an EX8200 Virtual Chassis*.

To install software upgrades on a switch with a single Routing Engine:

1. Download the software package as described in [“Downloading Software Packages from Juniper Networks” on page 43](#).
2. (Optional) Back up the current software configuration to a second storage option. See the *Junos OS Installation and Upgrade Guide* for instructions on performing this task.
3. (Optional) Copy the software package to the switch. We recommend that you use FTP to copy the file to the `/var/tmp` directory.

This step is optional because Junos OS can also be upgraded when the software image is stored at a remote location. These instructions describe the software upgrade process for both scenarios.

4. Install the new package on the switch:

```
user@switch> request system software add package
```

Replace **package** with one of the following paths:

- For a software package in a local directory on the switch—**/var/tmp/package.tgz**.
- For a software package on a remote server:
  - **ftp://hostname/pathname/package.tgz**
  - **http://hostname/pathname/package.tgz**

where *package.tgz* is, for example, **jinstall-ex-4200-9.4R1.8-domestic-signed.tgz**.

Include the optional **member** option to install the software package on only one member of an EX4200 Virtual Chassis:

```
user@switch> request system software add source member member-id reboot
```

Other members of the Virtual Chassis are not affected. To install the software on all members of the Virtual Chassis, do not include the **member** option.



**NOTE:** To abort the installation, do not reboot your device; instead, finish the installation and then issue the **request system software delete package.tgz** command, where *package.tgz* is, for example, **jinstall-ex-4200-10.2R1.8-domestic-signed.tgz**. This is your last chance to stop the installation.

The **request system software delete package.tgz** command is not available on EX2300 and EX3400 switches.

5. Reboot to start the new software:

```
user@switch> request system reboot
```

6. After the reboot has completed, log in and verify that the new version of the software is properly installed:

```
user@switch> show version
```

7. To ensure that the resilient dual-root partitions feature operates correctly, execute the following command to copy the new Junos OS image into the alternate root partition:

```
user@switch> request system snapshot slice alternate
```

To update the alternate root partitions on all members of a Virtual Chassis, use this command:

```
user@switch> request system snapshot slice alternate all-members
```

Resilient dual-root partitions allow the switch to boot transparently from the alternate root partition if the system fails to boot from the primary root partition.



**NOTE:** EX2300 and EX3400 switches have two volumes: JUNOS volume and OAM (recovery) volume. To store a snapshot (non-recovery) on JUNOS volume, use the command `request system snapshot`. To create snapshot (recovery) on the OAM volume, use the command `request system snapshot recovery`.

**Related Documentation**

- [Installing Software on EX Series Switches \(J-Web Procedure\) on page 51](#)
- [Troubleshooting Software Installation on page 97](#)
- [Junos OS Package Names for EX Series Switches on page 17](#)
- [Understanding Software Installation on EX Series Switches on page 28](#)

## Installing Software on an EX Series Switch with Redundant Routing Engines (CLI Procedure)

For an EX6200 switch or an EX8200 switch with redundant Routing Engines, you can minimize disruption to network operation during a Junos OS upgrade by upgrading the Routing Engines separately, starting with the backup Routing Engine.



**NOTE:** If your EX8200 switch is running Junos OS Release 10.4R3 or later, you can upgrade the software packages on both Routing Engines with a single command and with minimal network disruption by using nonstop software upgrade (NSSU) instead of this procedure. See *Upgrading Software on an EX6200 or EX8200 Standalone Switch Using Nonstop Software Upgrade (CLI Procedure)*.



**WARNING:** If graceful routing engine switchover (GRES) or nonstop active routing (NSR) is enabled when you initiate a software installation, the software does not install properly. Make sure you disable GRES before you begin the software installation by using the `deactivate chassis redundancy graceful-switchover` command in configuration mode. If GRES is enabled, it will be removed with the redundancy command. By default, NSR is disabled. If NSR is enabled, remove the `nonstop-routing` statement from the `[edit routing-options]` hierarchy level to disable it.

To upgrade the software package on an EX6200 switch or an EX8200 switch with one installed Routing Engine, see [“Installing Software on an EX Series Switch with a Single Routing Engine \(CLI Procedure\)” on page 44](#).

To upgrade redundant Routing Engines, you first install the new Junos OS release on the backup Routing Engine while keeping the currently running software version on the master Routing Engine. After making sure that the new software version is running correctly on

the backup Routing Engine, you switch device control to the backup Routing Engine. Finally, you install the new software on the new backup Routing Engine.

To upgrade Junos OS on the switch, perform the following tasks:

1. [Preparing the Switch for the Software Installation on page 47](#)
2. [Installing Software on the Backup Routing Engine on page 48](#)
3. [Installing Software on the Default Master Routing Engine on page 49](#)
4. [Returning Routing Control to the Default Master Routing Engine \(Optional\) on page 50](#)

## Preparing the Switch for the Software Installation

Perform the following steps before installing the software:

1. Log in to the master Routing Engine's console.

For information on logging in to the Routing Engine through the console port, see *Connecting and Configuring an EX Series Switch (CLI Procedure)*.

2. Enter the Junos OS CLI configuration mode:

- a. Start the CLI from the shell prompt:

```
user@switch:RE% cli
```

You will see:

```
{master}
user@switch>
```

- b. Enter configuration mode:

```
user@switch> configure
```

You will see:

```
{master}[edit]
user@switch#
```

3. Disable nonstop active routing (NSR) (supported on switches running Junos OS Release 10.4 or later):

```
{master}[edit]
user@switch# delete routing-options nonstop-routing
```

4. Disable graceful Routing Engine switchover (GRES):

```
{master}[edit]
user@switch# deactivate chassis redundancy graceful-switchover
```

5. Save the configuration change on both Routing Engines:

```
{master}[edit]
user@switch# commit synchronize
```



**NOTE:** To ensure the most recent configuration changes are committed before the software upgrade, perform this step even if nonstop active routing and graceful Routing Engine switchover were previously disabled.

6. Exit the CLI configuration mode:

```
[edit]
user@switch# exit
```

7. (Optional) Back up the current software configuration to a second storage option. See the [Junos OS Installation and Upgrade Guide](#) for instructions on performing this task.

## Installing Software on the Backup Routing Engine

After you have prepared the switch for software installation, install the software on the backup Routing Engine. During the installation, the master Routing Engine continues operations, minimizing the disruption to network traffic.

1. Download the software by following the procedures in “[Downloading Software Packages from Juniper Networks](#)” on page 43.
2. Copy the software package to the switch. We recommend that you use FTP to copy the file to the `/var/tmp` directory.
3. Log in to the console of the backup Routing Engine.
4. Install the new software package:

```
user@switch> request system software add /var/tmp/package.tgz
```

where *package.tgz* is, for example, *jinstall-ex-8200-10.2R1.8-domestic-signed.tgz*.



**NOTE:** To abort the installation, do not reboot your device; instead, finish the installation and then issue the `request system software delete package.tgz` command, where *package.tgz* is, for example, *jinstall-ex-8200-10.2R1.8-domestic-signed.tgz*. This is your last chance to stop the installation.

5. Reboot to start the new software:

```
user@switch> request system reboot
Reboot the system? [yes, no] (no) yes
```



**NOTE:** You must reboot the switch to load the new installation of the Junos OS.

6. After the reboot has completed, log in and verify the new version of the software is properly installed:

```
user@switch> show version
```



## Installing Software on the Default Master Routing Engine

To transfer control to the backup Routing Engine and then upgrade or downgrade the master Routing Engine software:

1. Log in to the master Routing Engine console port.
2. Transfer control to the backup Routing Engine:



**CAUTION:** Because graceful Routing Engine switchover is disabled, this switchover causes all line cards in the switch to reload. All network traffic passing through these line cards is lost during the line card reloads.

```
user@switch> request chassis routing-engine master switch
```

3. Verify that the default backup Routing Engine (shown as slot 1 in the command output) is now the master Routing Engine:

```
user@switch> show chassis routing-engine
```

You will see:

```
Routing Engine status:
Slot 0:
  Current state      Backup
  Election priority  Master (default)
Routing Engine status:
Slot 1:
  Current state      Master
  Election priority  Backup (default)
```

4. Install the new software package:

```
user@switch> request system software add package.tgz
```

5. Reboot the Routing Engine:

```
user@switch> request system reboot
Reboot the system? [yes, no] (no) yes
```

When the reboot completes, the prompt will reappear. Wait for this prompt to reappear before proceeding to the next step.

6. Log in to the default backup Routing Engine (slot 1) through the console port.
7. Re-enable graceful Routing Engine switchover:

```
[edit]
user@switch# activate chassis redundancy graceful-switchover
```

Re-enabling graceful Routing Engine switchover allows any future Routing Engine switchovers to occur without loss of any network traffic.

8. Re-enable nonstop active routing:

```
[edit]
user@switch# set routing-options nonstop-routing
```



**NOTE:** Automatic commit synchronization is a requirement for nonstop active routing. If you have not yet enabled it, do so with the `set system commit synchronize` command.

9. Save the configuration change:

```
[edit]
user@switch# commit synchronize
```

10. To ensure that the resilient dual-root partitions feature operates correctly, execute the following command to copy the new Junos OS image into the alternate root partition on each Routing Engine:

```
user@switch> request system snapshot slice alternate routing-engine both
```

Resilient dual-root partitions allow the switch to boot transparently from the alternate root partition if the system fails to boot from the primary root partition.

If you want to return routing control to the Routing Engine that was the master Routing Engine at the beginning of the procedure (the default master Routing Engine), perform the next task.

### Returning Routing Control to the Default Master Routing Engine (Optional)

The switch can maintain normal operations with the Routing Engine in slot 1 acting as the master Routing Engine after the software upgrade, so only perform this task if you want to return routing control to the default master Routing Engine in slot 0.

1. Transfer routing control back to the default master Routing Engine:

```
user@switch> request chassis routing-engine master switch
```

2. Verify that the default master Routing Engine (slot 0) is indeed the master Routing Engine:

```
user@switch> show chassis routing-engine
```

You will see:

```
Routing Engine status:
Slot 0:
  Current state      Master
  Election priority  Master (default)
Routing Engine status:
Slot 1:
  Current state      Backup
  Election priority  Backup (default)
```

#### Related Documentation

- [Installing Software on EX Series Switches \(J-Web Procedure\) on page 51](#)
- [Upgrading Software on an EX6200 or EX8200 Standalone Switch Using Nonstop Software Upgrade \(CLI Procedure\)](#)
- [Troubleshooting Software Installation on page 97](#)
- [Junos OS Package Names for EX Series Switches on page 17](#)

- [Understanding Software Installation on EX Series Switches on page 28](#)

## Installing Software on EX Series Switches (J-Web Procedure)

You can upgrade software packages on a single fixed-configuration switch, on an individual member of a Virtual Chassis, or for all members of a Virtual Chassis.

You can use the J-Web interface to install software upgrades from a server using FTP or HTTP, or by copying the file to the EX Series switch.

This topic describes:

1. [Installing Software Upgrades from a Server on page 51](#)
2. [Installing Software Upgrades by Uploading Files on page 52](#)

### Installing Software Upgrades from a Server

To install software upgrades from a remote server by using FTP or HTTP:

1. Download the software package as described in [“Downloading Software Packages from Juniper Networks” on page 43](#).
2. Log in to the Juniper Networks authentication system using the username (generally your e-mail address) and password supplied by Juniper Networks representatives.
3. In the J-Web interface, select **Maintain > Software > Install Package**.
4. On the Install Remote page, enter information into the fields described in [Table 6 on page 51](#).
5. Click **Fetch and Install Package**. The software is activated after the switch has rebooted.

**Table 6: Install Remote Summary**

Field	Function	Your Action
Package Location (required)	Specifies the FTP or HTTP server, file path, and software package name.	Type the full address of the software package location on the FTP or HTTP server—one of the following:  <code>ftp://hostname/pathname/package-name</code> <code>http://hostname/pathname/package-name</code>
User	Specifies the username, if the server requires one.	Type the username.
Password	Specifies the password, if the server requires one.	Type the password.
Reboot If Required	<p><b>NOTE:</b> The Reboot check box will be disabled if you enter a J-Web Application package name in the Package Location text box. To enable the Reboot check box, enter a Junos package name in the Package Location text box.</p> <p>If this box is checked, the switching platform will automatically reboot when the upgrade is complete.</p>	Check the box if you want the switching platform to reboot automatically when the upgrade is complete.

## Installing Software Upgrades by Uploading Files

To install software upgrades by uploading files:

1. Download the software package.
2. In the J-Web interface, select **Maintain>Software>Upload Package**.
3. On the Upload Package page, enter information into the fields described in [Table 7 on page 52](#).
4. Click **Upload and Install Package**. The software is activated after the switching platform completes the installation procedure.

**Table 7: Upload Package Summary**

Field	Function	Your Action
File to Upload (required)	Specifies the location of the software package.	Type the location of the software package, or click <b>Browse</b> to navigate to the location.
Reboot If Required	Specifies that the switching platform is automatically rebooted when the upgrade is complete.	Select the check box if you want the switching platform to reboot automatically when the upgrade is complete.

### Related Documentation

- [Installing Software on an EX Series Switch with a Single Routing Engine \(CLI Procedure\) on page 44](#)
- [Understanding Software Installation on EX Series Switches on page 28](#)
- [Troubleshooting Software Installation on page 97](#)

## Booting an EX Series Switch Using a Software Package Stored on a USB Flash Drive

There are two methods of getting Junos OS stored on a USB flash drive before using the software to boot the switch. You can pre-install the software onto the USB flash drive before inserting the USB flash drive into the USB port, or you can use the system snapshot feature to copy files from internal switch memory to the USB flash drive.

To move files into USB flash memory by using a system snapshot and use those files to boot the switch, see [“Creating a Snapshot and Using It to Boot an EX Series Switch” on page 54](#). We recommend that you use this method to boot the switch from a USB flash drive if your switch is running properly.

If you need to pre-install the software onto the USB flash drive, you can use the method described in this topic. Pre-installing Junos OS onto a USB flash drive to boot the switch can be done at any time and is particularly useful when the switch boots to the loader prompt because the switch cannot locate the Junos OS in internal flash memory.

Ensure that you have the following tools and parts available to boot the switch from a USB flash drive:

- A USB flash drive that meets the EX Series switch USB port specifications. See *USB Port Specifications for an EX Series Switch*.
- A computer or other device that you can use to download the software package from the Internet and copy it to the USB flash drive.

To download a Junos OS package onto a USB flash drive before inserting the USB flash drive:

1. Download the Junos OS package that you want to place onto the EX Series switch from the Internet onto the USB flash drive by using your computer or other device. See [“Downloading Software Packages from Juniper Networks” on page 43](#).
2. Remove the USB flash drive from the computer or other device.
3. Insert the USB flash drive into the USB port on the switch.
4. This step can be performed only when the prompt for the loader script (**loader>**) is displayed. The loader script starts when the Junos OS loads but the CLI is not working for any reason or if the switch has no software installed.

Install the software package onto the switch:

```
loader> install source
```

where **source** represents the name and location of the Junos OS package on the USB flash drive. The Junos OS package on a flash drive is commonly stored in the root drive as the only file—for example, **file:///jinstall-ex-4200-9.4R1.5-domestic-signed.tgz**.

#### Related Documentation

- [Installing Software on an EX Series Switch with a Single Routing Engine \(CLI Procedure\) on page 44](#)
- [Installing Software on EX Series Switches \(J-Web Procedure\) on page 51](#)
- [Understanding Software Installation on EX Series Switches on page 28](#)
- See *EX2200 Switches Hardware Overview* for USB port location.
- See *Rear Panel of an EX3200 Switch* for USB port location.
- See *Rear Panel of an EX3300 Switch* for USB port location.
- See *Rear Panel of an EX4200 Switch* for USB port location.
- See *EX4300 Switches Hardware Overview* for USB port location.
- See *Front Panel of an EX4500 Switch* for USB port location.
- See *EX4550 Switches Hardware Overview* for USB port location.
- See *Switch Fabric and Routing Engine (SRE) Module in an EX6200 Switch* for USB port location.
- See *Switch Fabric and Routing Engine (SRE) Module in an EX8208 Switch* for USB port location.
- See *Routing Engine (RE) Module in an EX8216 Switch* for USB port location.

## Creating a Snapshot and Using It to Boot an EX Series Switch

---

The system snapshot feature takes a “snapshot” of the files currently used to run the switch and copies them to an alternate storage location. You can then use this snapshot to boot the switch at the next bootup or as a backup boot option.

This topic includes the following tasks:

- [Creating a Snapshot on a USB Flash Drive and Using It to Boot the Switch on page 54](#)

### Creating a Snapshot on a USB Flash Drive and Using It to Boot the Switch

You can create a snapshot on USB flash memory after a switch is booted by using files stored in internal memory.

Ensure that you have the following tools and parts available before creating a snapshot on a USB flash drive:

- A USB flash drive that meets the switch USB port specifications. See *USB Port Specifications for an EX Series Switch*.

To create a snapshot on USB flash memory and use it to boot the switch:

1. Place the snapshot into USB flash memory:  

```
user@switch> request system snapshot partition media usb
```
2. (Optional) Perform this step if you want to boot the switch now using the snapshot stored on the USB flash drive.  

```
user@switch> request system reboot media usb
```

#### Related Documentation

- [Verifying That a System Snapshot Was Created on an EX Series Switch on page 58](#)
- [Understanding System Snapshot on EX Series Switches on page 31](#)

## Rebooting or Halting the EX Series Switch (J-Web Procedure)

---

You can use the J-Web interface to schedule a reboot or to halt the switching platform.

To reboot or halt the switching platform by using the J-Web interface:

1. In the J-Web interface, select **Maintain > Reboot**.
2. Select one:
  - **Reboot Immediately**—Reboots the switching platform immediately.
  - **Reboot in *number of minutes***—Reboots the switch in the number of minutes from now that you specify.

- **Reboot when the system time is *hour:minute*** —Reboots the switch at the absolute time that you specify, on the current day. You must select a 2-digit hour in 24-hour format and a 2-digit minute.
  - **Halt Immediately**— Stops the switching platform software immediately. After the switching platform software has stopped, you can access the switching platform through the console port only.
3. (Optional) In the Message box, type a message to be displayed to any users on the switching platform before the reboot occurs.
  4. Click **Schedule**. The J-Web interface requests confirmation to perform the reboot or halt.
  5. Click **OK** to confirm the operation.
    - If the reboot is scheduled to occur immediately, the switch reboots. You cannot access the J-Web interface until the switch has restarted and the boot sequence is complete. After the reboot is complete, refresh the browser window to display the J-Web interface login page.
    - If the reboot is scheduled to occur in the future, the Reboot page displays the time until reboot. You have the option to cancel the request by clicking **Cancel Reboot** on the J-Web interface Reboot page.
    - If the switch is halted, all software processes stop and you can access the switching platform through the console port only. Reboot the switch by pressing any key on the keyboard.

**Related Documentation**    • *Starting the J-Web Interface*

---

## Monitoring Zero Touch Provisioning

You can use the console and operational commands to monitor Zero Touch Provisioning.

1. [Using the Console to Monitor Zero Touch Provisioning on page 55](#)
2. [Using System Log Alerts to Monitor Zero Touch Provisioning on page 56](#)
3. [Using Error Messages to Monitor Zero Touch Provisioning on page 56](#)
4. [Using System Log Files to Monitor Zero Touch Provisioning on page 56](#)
5. [Using the show dhcp client binding Command on page 57](#)
6. [Using the show dhcp client statistics Command on page 57](#)

### Using the Console to Monitor Zero Touch Provisioning

The following Zero Touch Provisioning (ZTP) activities are displayed on the console during the ZTP process:

- Starting and ending times of ZTP process.
- Lists of bound and unbound DHCP client interfaces.
- DHCP options that DHCP servers send to DHCP clients.

- Logs indicating which interfaces are used for ZTP.
- ZTP parameters that DHCP clients obtain from DHCP servers.
- File names of configuration and image files, names of file servers, protocols used to fetch files, and times when DHCP servers fetch configuration and image files.
- Failure states caused by files not being on servers, or unreachable servers, and time outs.
- Number of attempts made, and number of attempts remaining, for retry in current ZTP cycle.
- Completion of file transfers.
- Installation, reboot, and state of ZTP process.
- Internal state errors and termination of ZTP process.
- Logs for when default routes were added or deleted.

### Using System Log Alerts to Monitor Zero Touch Provisioning

**Purpose** In this example, the system log alert alerts you that the auto-image upgrade will start.

**Action** Use the following system log alert to monitor the auto-image upgrade process.

“ALERT:Auto-image upgrade will start. This can terminate config CLI session(s). Modified configuration will be lost. To stop Auto-image, in CLI do the following: 'edit; delete chassis auto-image-upgrade; commit'.”

“Checking whether image upgrade is already invoked”

**Meaning** This system log alert indicates that the auto-image upgrade will start, and provides information on how to stop the auto-image upgrade process.

### Using Error Messages to Monitor Zero Touch Provisioning

**Purpose** Error messages provide information on which DHCP options are not configured.

**Action** Use the information in the following error message to find out which DHCP options are not configured.

“DHCP Log Server Option”  
“DHCP Host Name Option”  
“DHCP NTP Server Option”

**Meaning** The error message indicates that the DHCP log server, hostname, and NTP server options are not configured.

### Using System Log Files to Monitor Zero Touch Provisioning

**Purpose** System log files provide information on the state of the auto-upgrade process, lists of bound and unbound DHCP client interfaces, IP addresses of file servers, names and locations of image and configuration files, and successful and failed attempts at fetching configuration and image files.



**Action** Use the information in the following system log files to monitor the auto-upgrade process.

Auto Image Upgrade: Start fetching config-file file from server 1.1.1.1 through irb using ftp

Auto Image Upgrade: Tried [2] attempts to fetch config-file file from server 1.1.1.1 through irb. Summary: "Retrieving /config-file :: Failed to open file.". To retry [4] times.

Auto Image Upgrade: Tried [4] attempts to fetch config-file file from server 1.1.1.1 through irb. Summary: "Retrieving /config-fileconfig-file :: Failed to open file.". To retry [2] times.

Auto Image Upgrade: Tried [6] attempts to fetch config-file file from server 1.1.1.1 through irb. Summary: "Retrieving /config-file :: Failed to open file.". To retry [0] times.

Auto Image Upgrade: All [6] attempts to fetch config-file file from server 1.1.1.1 through irb FAILED. Start retry again in few minutes.

**Meaning** These system log files indicate that there were six failed attempts to fetch the configuration file from the file server, the IP address of the file server, the DHCP client interface name, and the number of times the retry process occurred.

## Using the show dhcp client binding Command

**Purpose** Issue the **show dhcp client binding** command to display DHCP client binding information

**Action** Issue the **show dhcp client binding** command to display the IP address of the DHCP client, the hardware address of the DHCP client, number of seconds in which the DHCP client's IP address lease expires, state of the DHCP client IP address in the binding table, and the name of the interface that has active client bindings.

### show dhcp client binding

```
user@switch# show dhcp client binding
```

IP address	Hardware address	Expires	State	Interface
0.0.0.0	00:22:83:2a:db:dc	0	SELECTING	irb.0
10.6.6.13	00:22:83:2a:db:dd	49201	BOUND	vme.0
0.0.0.0	00:22:83:2a:db:df	0	SELECTING	xe-0/0/0.0
0.0.0.0	00:22:83:2a:db:e0	0	SELECTING	xe-0/0/1.0

**Meaning** The output of this command shows that there is one client interface that is bound, and that there are three interfaces that are receiving DHCP offers from the DHCP server.

## Using the show dhcp client statistics Command

**Purpose** Issue the **show dhcp client statistics** command to display DHCP client statistics.

**Action** Issue the **show dhcp client statistics** command to display DHCP client statistics, such as the number of packets dropped, and the number DHCP and BOOTP messages sent and received.

### show dhcp client statistics

```
user@switch# show dhcp client statistics
Packets dropped:
  Total                14
  Send error           14
Messages received:
  BOOTREPLY            5
  DHCPOFFER            1
  DHCPACK              4
  DHCPNAK              0
  DHCPFORCERENEW       0
Messages sent:
  BOOTREQUEST          6751
  DHCPDECLINE          0
  DHCPDISCOVER         6747
  DHCPREQUEST          4
  DHCPINFORM           0
  DHCPRELEASE          0
  DHCPRENEW            0
  DHCPREBIND           0
```

**Meaning** The output of this command displays how many packets were dropped with errors, the number of BOOTREPLY and DHCPOFFER messages that were received, and the number of BOOTREQUEST and DHCPREQUEST messages that were sent.

**Related Documentation**

- [Understanding Zero Touch Provisioning on page 21](#)
- [Configuring Zero Touch Provisioning on page 38](#)

---

## Verifying That a System Snapshot Was Created on an EX Series Switch

**Purpose** Verify that a system snapshot was created with the proper files on an EX Series switch.

**Action** View the snapshot:

```
user@switch> show system snapshot media external
Information for snapshot on      external (/dev/dals1a) (backup)
Creation date: Mar 19 03:37:18 2012
JUNOS version on snapshot:
  jbase : ex-12.1I20120111_0048_user
  jcrypto-ex: 12.1I20120111_0048_user
  jdocs-ex: 12.1I20120111_0048_user
  jroute-ex: 12.1I20120111_0048_user
  jswitch-ex: 12.1I20120111_0048_user
  jweb-ex: 12.1I20120111_0048_user
Information for snapshot on      external (/dev/dals2a) (primary)
Creation date: Mar 19 03:38:25 2012
JUNOS version on snapshot:
  jbase : ex-12.2I20120305_2240_user
  jcrypto-ex: 12.2I20120305_2240_user
  jdocs-ex: 12.2I20120305_2240_user
  jroute-ex: 12.2I20120305_2240_user
  jswitch-ex: 12.2I20120305_2240_user
  jweb-ex: 12.2I20120305_2240_user
```

**Meaning** The output shows the date and time when the snapshot was created and the packages that are part of the snapshot. Check to see that the date and time match the time when you created the snapshot.

You can compare the output of this command to the output of the **show system software** command to ensure that the snapshot contains the same packages as the software currently running the switch.

**Related Documentation**

- [Creating a Snapshot and Using It to Boot an EX Series Switch on page 54](#)

## Verifying Junos OS and Boot Loader Software Versions on an EX Series Switch

Before or after upgrading or downgrading Junos OS, you might need to verify the Junos OS version. You might also need to verify the boot loader software version if you are upgrading to or downgrading from a release that supports resilient dual-root partitions (Junos OS Release 10.4R3 and later).

This topic includes:

- [Verifying the Number of Partitions and File System Mountings on page 59](#)
- [Verifying the Loader Software Version on page 60](#)
- [Verifying Which Root Partition Is Active on page 61](#)
- [Verifying the Junos OS Version in Each Root Partition on page 61](#)

### Verifying the Number of Partitions and File System Mountings

**Purpose** Between Junos OS Release 10.4R2 and Release 10.4R3, upgrades were made to further increase resiliency of root partitions, which required reformatting the disk from three partitions to four partitions. If your switch is running Release 10.4R2 or earlier, it has three partitions, and if it is running Release 10.4R3 or later, it has four partitions.

**Action** Verify how many partitions the disk has, as well as where each file system is mounted, by using the following command:

```
user@switch> show system storage
fpc0:
```

```
-----
Filesystem Size Used Avail Capacity Mounted on
/dev/da0s1a 184M 124M 45M 73% /
devfs 1.0K 1.0K 0B 100% /dev
/dev/md0 37M 37M 0B 100% /packages/mnt/jbase
/dev/md1 18M 18M 0B 100%
/packages/mnt/jcrypto-ex-10.4I20110121_0509_hbRPSRLI15184421081
/dev/md2 6.1M 6.1M 0B 100%
/packages/mnt/jdocs-ex-10.4I20110121_0509_hbRPSRLI15184421081
/dev/md3 154M 154M 0B 100%
/packages/mnt/jkernel-ex-10.4I20110121_0509_hbRPSRLI15184421081
/dev/md4 23M 23M 0B 100%
/packages/mnt/jpfe-ex42x-10.4I20110121_0509_hbRPSRLI15184421081
/dev/md5 46M 46M 0B 100%
/packages/mnt/jroute-ex-10.4I20110121_0509_hbRPSRLI15184421081
/dev/md6 28M 28M 0B 100%
```

```

/packages/mnt/jswitch-ex-10.4I20110121_0509_hbRPSRLI15184421081
/dev/md7      22M   22M   0B    100%
/packages/mnt/jweb-ex-10.4I20110121_0509_hbRPSRLI15184421081
/dev/md8      126M  10.0K 116M   0%  /tmp
/dev/da0s3e   123M   632K 112M   1%  /var
/dev/da0s3d   369M    20K 339M   0%  /var/tmp
/dev/da0s4d    62M    62K  57M   0%  /config
/dev/md9      118M   12M   96M  11%  /var/rundb
procfs        4.0K   4.0K   0B   100%  /proc
/var/jail/etc 123M   632K 112M   1%
/packages/mnt/jweb-ex-10.4I20110121_0509_hbRPSRLI15184421081/jail/var/etc
/var/jail/run 123M   632K 112M   1%
/packages/mnt/jweb-ex-10.4I20110121_0509_hbRPSRLI15184421081/jail/var/run
/var/jail/tmp 123M   632K 112M   1%
/packages/mnt/jweb-ex-10.4I20110121_0509_hbRPSRLI15184421081/jail/var/tmp
/var/tmp      369M    20K 339M   0%
/packages/mnt/jweb-ex-10.4I20110121_0509_hbRPSRLI15184421081/jail/var/tmp/uploads
devfs         1.0K   1.0K   0B   100%
/packages/mnt/jweb-ex-10.4I20110121_0509_hbRPSRLI15184421081/jail/dev

```

**Meaning** The presence of the partition name containing **s4d** indicates that there is a fourth slice. If this were a three-slice partition scheme, in place of **s1a**, **s3e**, **s3d**, and **s4d**, you would see **s1a**, **s1f**, **s2a**, **s2f**, **s3d**, and **s3e** and you would not see **s4d**.

## Verifying the Loader Software Version

**Purpose** For the special case of upgrading from Junos OS Release 10.4R2 or earlier to Release 10.4R3 or later, you must upgrade the loader software.

**Action** For EX Series switches except EX8200 switches:

```

user@switch> show chassis firmware
Part                Type      Version
FPC 0               uboot     U-Boot 1.1.6 (Jan  3 2011 - 16:14:58) 1.0.0

                  loader     FreeBSD/PowerPC U-Boot bootstrap loader 2.4

```

For EX8200 switches:

```

user@switch> show chassis firmware
Part                Type      Version
FPC 0               uboot     U-Boot 1.1.6 (Jan  3 2011 - 16:14:58) 3.5.0

                  loader     FreeBSD/PowerPC U-Boot bootstrap loader 2.4

```

**Meaning** For EX Series switches other than EX8200 switches, with Junos OS Release 10.4R3 or later installed:

- If there is version information following the timestamp for **U-Boot** (1.0.0 in the preceding example), then the loader software does not require upgrading.
- If there is no version number following the timestamp for **U-boot**, then the loader software requires upgrading.



**NOTE:** If the software version is Release 10.4R2 or earlier, no version number is displayed following the timestamp for U-boot, regardless of the loader software version installed. If you do not know whether you have installed the new loader software, we recommend that you upgrade the loader software when you upgrade the software version.

For EX8200 switches, if the version number following the timestamp for **U-Boot** is earlier than **3.5.0**, you must upgrade the loader software when you upgrade the software version.

## Verifying Which Root Partition Is Active

**Purpose** Switches running Release 10.4R3 or later have resilient dual-root partition functionality, which includes the ability to boot transparently from the inactive partition if the system fails to boot from the primary root partition.

You can verify which root partition is active using the following command:

**Action** user@switch> `show system storage partitions`  
fpc0:

```
-----
Boot Media: internal (da0)
Active Partition: da0s1a
Backup Partition: da0s2a
Currently booted from: active (da0s1a)

Partitions information:
  Partition  Size  Mountpoint
  s1a        184M  /
  s2a        184M  altroot
  s3d        369M  /var/tmp
  s3e        123M  /var
  s4d         62M  /config
  s4e                unused (backup config)
```

**Meaning** The **Currently booted from:** field shows which root partition is active.

## Verifying the Junos OS Version in Each Root Partition

**Purpose** Each switch contains two root partitions. We recommend that you copy the same Junos OS version in each partition when you upgrade. In Junos OS Release 10.4R2 and earlier, you might choose to have different Junos OS release versions in each partition. You might have different versions during a software upgrade and before you have finished verifying the new software installation. To enable a smooth reboot if corruption is found in the primary root file system, ensure that the identical Junos OS images are in each root partition. For Release 10.4R2 and earlier, you must manually reboot the switch from the backup root partition. However, for Release 10.4R3 and later, the switch reboots automatically from the backup root partition if it fails to reboot from the active root partition.

**Action** Verify whether both root partitions contain the same image by using the following command:

```
user@switch> show system snapshot media internal
Information for snapshot on      internal (/dev/da0s1a) (backup)
Creation date: Jan 11 03:02:59 2012
JUNOS version on snapshot:
  jbase   : ex-12.2I20120305_2240_user
  jcrypto-ex: 12.2I20120305_2240_user
  jdocs-ex: 12.2I20120305_2240_user
  jroute-ex: 12.2I20120305_2240_user
  jswitch-ex: 12.2I20120305_2240_user
  jweb-ex: 12.2I20120305_2240_user
Information for snapshot on      internal (/dev/da0s2a) (primary)
Creation date: Mar 6 02:24:08 2012
JUNOS version on snapshot:
  jbase   : ex-12.2I20120305_2240_user
  jcrypto-ex: 12.2I20120305_2240_user
  jdocs-ex: 12.2I20120305_2240_user
  jroute-ex: 12.2I20120305_2240_user
  jswitch-ex: 12.2I20120305_2240_user
  jweb-ex: 12.2I20120305_2240_user
```

**Meaning** The command shows which Junos OS version is installed on each media partition. Verify that the same version is installed on both partitions.

- Related Documentation**
- [Troubleshooting Software Installation on page 97](#)
  - [Troubleshooting a Switch That Has Booted from the Backup Junos OS Image on page 100](#)
  - [Understanding Resilient Dual-Root Partitions on Switches on page 32](#)
  - [Resilient Dual-Root Partitions Frequently Asked Questions](#)

## CHAPTER 4

# Junos OS With Upgraded FreeBSD for EX2300 and EX3400 Switches

- [Understanding Junos OS with Upgraded FreeBSD for EX2300 and EX3400 Switches on page 63](#)
- [Understanding Junos OS with Upgraded FreeBSD Package Names for EX2300 and EX3400 Switches on page 66](#)
- [Understanding Junos OS with Upgraded FreeBSD Disk Volumes on page 67](#)
- [Upgrading Junos OS with Upgraded FreeBSD on page 68](#)
- [Understanding Junos OS with Upgraded FreeBSD Snapshots on page 75](#)

## Understanding Junos OS with Upgraded FreeBSD for EX2300 and EX3400 Switches

Junos OS with an upgraded FreeBSD kernel provides a clean-slate implementation of Junos OS on top of a pristine (minimally modified) and current version of the FreeBSD OS.

The platforms currently running Junos OS with upgraded FreeBSD are listed in [Table 8 on page 63](#).

**Table 8: Upgraded FreeBSD Kernel Support by Hardware Platform**

Platforms	CPU Type	Release Introduced
EX2300	Intel	15.1X53-D50
EX3400	Intel	15.1X53-D50

The major processing changes are as follows:

- Interactions between Junos OS and the upgraded FreeBSD kernel use well-established interfaces because Junos OS is now layered on a minimally modified and current version of FreeBSD.
- Symmetric multiprocessing (SMP) is enabled by default.
- FreeBSD provides a consistent runtime environment for all Junos OS platforms.

There are also major changes in file structures and software packages. These changes are as follows:

- New packages use XML description files instead of scripts.
- Multiple package sets (a collection of installed packages) are stored on the router at the same time. Sets can be either active (the currently used set), pending (the set that should be used at the next reboot), or previous (a formerly active set). Non-recovery snapshots (but not recoverable image snapshots) are available for the package sets to preserve package content lists.

There is now a separate Operations, Administration, and Maintenance (OAM) volume (**oam**) distinct from the Junos OS volume (**junos**).

One major change is the distinction between recovery snapshots and non-recovery snapshots.

The major characteristics of the recovery snapshots are as follows:

- Recovery snapshots are full copies of the packages and configuration taken at the time the snapshot command is issued.
- Recovery snapshots reside on the OAM volume or USB medium.

The major characteristics of the non-recovery snapshots are as follows:

- Non-recovery snapshots are snapshots residing on the Junos OS volume that refer to the current running set of packages and a copy of the configuration at the time the snapshot command is issued.
- Non-recovery snapshots do not need to copy the whole Junos OS installation and so are very fast.
- Non-recovery snapshots can be requested as the boot image for the next reboot.

The upgraded FreeBSD kernel requires changes to several commands and statements and their related parameters. The new and changed actions are summarized in [Table 9 on page 64](#). For details on the changes, see the topics covering the specific command or statement.

**Table 9: New and Changed Commands and Statements for Junos OS with Upgraded FreeBSD**

Command or Statement	Release Introduced	Change
<code>request system snapshot delete <i>snapshot</i></code>	15.1	New action
<code>request system snapshot recovery</code>	15.1	New action
<code>request system snapshot load <i>snapshot</i></code>	15.1	New action
<code>request system recover <i>volume</i></code>	15.1	New action: <i>volume</i> is either <code>/junos-volume</code> or <code>/oam-volume</code>
<code>request system snapshot</code>	15.1	Changed action



Table 9: New and Changed Commands and Statements for Junos OS with Upgraded FreeBSD (continued)

Command or Statement	Release Introduced	Change
show system snapshot	15.1	Changed action

The new FreeBSD kernel also requires that several commands and statements are now deprecated. In some cases, these commands and statements generate an error, and, in other cases, the result is appropriate for the new kernel. The deprecated commands and statements are summarized in [Table 10 on page 65](#). For details, see the topics covering the specific command or statement.

Table 10: Deprecated Commands and Statements for Junos OS with Upgraded FreeBSD

Deprecated Command or Configuration Statement	Release Deprecated
Deprecated Command	
request system partition abort	15.1
request system partition compact-flash	15.1
request system partition hard-disk	15.1
request system snapshot <config-partition>	15.1
request system snapshot <root-partition>	15.1
request system snapshot <slice>	15.1
request system software delete-backup	15.1
request system software rollback <force>	15.1
show system processes providers	15.1
show system snapshot <slice>	15.1
Deprecated Configuration Statement	
set system mirror-flash-on-disk	15.1

#### Related Documentation

- [Upgrading Junos OS with Upgraded FreeBSD on page 68](#)
- [Downgrading Junos OS from Upgraded FreeBSD](#)
- [request system snapshot \(Junos OS with Upgraded FreeBSD\) on page 123](#)
- [show system snapshot \(Junos OS with Upgraded FreeBSD\) on page 173](#)
- [request system reboot \(Junos OS with Upgraded FreeBSD\) on page 125](#)

## Understanding Junos OS with Upgraded FreeBSD Package Names for EX2300 and EX3400 Switches

---

Starting with Junos OS Release 15.1, certain hardware platforms run a Junos OS based on an upgraded FreeBSD kernel (hereafter called Junos OS with upgraded FreeBSD). In releases earlier than Junos OS Release 15.1, software packages came in several major software package categories, such as domestic, worldwide, or Federal Information Processing Standard (FIPS). However, Junos OS with upgraded FreeBSD has a new naming convention: There is only one category, and FIPS, instead of being a separate category, is an option you select on installation. This topic describes the simplified naming convention for Junos OS with upgraded FreeBSD.

If your hardware platform is listed in the table in *Understanding Junos OS with Upgraded FreeBSD*, then you must use the new package names for download and installation.

The components of the new package naming conventions are as follows:

- **Prefix**—This is **junos-arm**. This prefix takes the place of the prefix **jinstall** and the bundle **jbundle**. We still use the term *bundle* in the new package-naming convention.
- **Media keyword**—Added to the prefix, a media keyword is only used when the image is not for use with the **request system software add** command. Values for the **media** keyword include **usb** for images installed from a USB drive or **net** for images installed from the loader prompt; for example, the entire prefix of your package might be **jjunos-install-media-net** or **jjunos-install-media-usb**.
- **Architecture**—This field indicates the CPU architecture of the platforms. Values include **x86** for Intel and **arm** for Advanced RISC Machines CPUs.
- **Application Binary Interface (ABI)**—This field indicates the “word length” of the CPU architecture. Values include **32** for 32-bit architectures and **64** for 64-bit architectures.
- **Release**—This field indicates the release number, such as **15.1R1.9**.
- **Edition**—The edition field is null (empty) for the standard (domestic) images. For jurisdictions with limits on dataplane encryption, this field is set to **limited**.

As before, all images are in tarred and gzipped (**.tgz**) format.



**NOTE:** There are no longer “export” worldwide images or separate FIPS images. The keyword “signed” no longer appears because all Junos OS images are signed for validation.

---

Examples of valid Junos OS software package names include the following:

- **junos-arm-32-15.1X53-D50.2.tgz**—An image for a EX2300 and EX3400 platform outside the RTZ.
- **junos-arm-32-15.1X53-D50.2-limited.tgz**—An image for a EX2300 and EX3400 platform used in the RTZ.
- **junos-install-media-usb-arm-32-15.1X53-D50.2.img**—An image stored on and installed from a USB drive for a EX2300 and EX3400 platform outside the RTZ.
- **junos-install-media-net-arm-32-15.1X53-D50.2.tgz**—An image stored on the tftpserver and installed from a loader prompt

**Related  
Documentation**

- [Understanding Junos OS with Upgraded FreeBSD for EX2300 and EX3400 Switches on page 63](#)
- [Upgrading Junos OS with Upgraded FreeBSD on page 68](#)

---

## Understanding Junos OS with Upgraded FreeBSD Disk Volumes

---

Starting with Junos OS Release 15.1, certain hardware platforms have a new disk naming convention. These platforms run a Junos OS based on an upgraded FreeBSD kernel instead of older versions of FreeBSD.

The hardware platforms listed in the table in *Understanding Junos OS with Upgraded FreeBSD* have two volumes. The main device is the **/junos** volume and contains all of the software and files needed for the day-to-day running of the device. The compact flash drive is the **/oam** volume and stores recovery snapshot backup information. In case of failure of the main drive (that is, the **/junos** volume), the **/oam** volume can be used to boot the system.

Because the **/junos** and **/oam** volumes have very different purposes, their content is different. Technically, these volumes are **dev/gpt/oam** and **dev/gpt/junos**, but the short forms (**/junos** and **/oam**) are used in this topic. Essentially, the **/junos** volume is used for the running device software and holds configuration information and logs, whereas the **/oam** volume is used for backup copies of everything needed in the event that the **/junos** volume fails.

The **/junos** volume contains a directory named **/packages/db** that has all the components present on the device, such as **os-kernel-123**, **os-kernel-456**, and so on. A sibling directory named **/package-sets** is also present. Package sets are an important concept in Junos OS with upgraded FreeBSD.

The **/package-sets** directory contains a package listing that gathers all the components of the running Junos OS into an XML format in the **/active** subdirectory. So **os-kernel-123** could be a component in the **/package-sets/active** subdirectory, but then **os-kernel-456** could not be in the same XML package. Package sets do not contain the kernel software itself (for example), but tell the device where to find the kernel component needed for the software package. The same kernel can be present in several package listings, but only one package can be active and running on the device at any given time.

There are several directories on the **/junos** volume where a particular software package listing can be found:

- **/previous**—The package set in this directory contains the list of all the components that ran on the device before the last upgrade.
- **/active**—The package set in this directory contains the list of all the software components currently running on the device.
- **/pending**—The package set in this directory contains the list of all the software components on the device that will run after the next reboot.



**NOTE:** After a successful reboot, the package set in the **/pending** directory becomes the active package set, and the package set in the **/active** directory becomes the previous set.

The **/junos** volume also contains non-recovery snapshots taken with the **request system snapshot** command. These types of snapshots are new to Junos OS with upgraded FreeBSD and cannot be used for recovery of a failed system. Non-recovery snapshots are a special type of package set that includes a copy of the configuration. There can be many non-recovery snapshots on the device, and the files can be renamed. Multiple non-recovery snapshots, essentially lists of software components and configuration files, can be helpful when major software or configuration changes are occurring and establishment of a known stable system baseline is required.

On the other hand, a recovery snapshot, created with the **request system snapshot recovery** command, is stored on the **/oam** volume and is always replaced when a new recovery snapshot is taken.

The **/oam** volume should contain all the information needed to reboot the system if there is a failure of the **/junos** volume and restore the system to the state running at the time of the failure. In order to perform this reboot, the **/oam** volume needs to have all of the information required to provide the system with a running configuration. This information is provided by the recovery snapshot, created with the **request system snapshot recovery** command. Although it can take a while to perform, the recovery snapshot establishes an **.izo** or **.iso** image of the running Junos OS.

In the case of a total failure of the **/junos** volume, the system can be booted from the **/oam** volume. The recovery snapshot can then restore the repaired system.

**Related  
Documentation**

- *Understanding Junos OS with Upgraded FreeBSD*
- [Upgrading Junos OS with Upgraded FreeBSD on page 68](#)

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## Upgrading Junos OS with Upgraded FreeBSD

Starting with Junos OS Release 15.1, certain hardware platforms run an upgraded FreeBSD kernel instead of older versions of FreeBSD.

Before you begin:

1. Verify that the upgrade applies to your router or switch model, as listed in *Understanding Junos OS with Upgraded FreeBSD*.
2. Download the Junos OS package.
3. Determine the upgrade path to follow.

The current Junos OS release determines the upgrade path to Junos OS with upgraded FreeBSD, as shown in [Table 11 on page 69](#). Other upgrade paths might work, but they are not supported.

**Table 11: Upgrade Path to Junos OS with the Upgraded FreeBSD**

Current Router's Junos OS Release	Upgrade Path
12.3 or earlier	Upgrade to 13.3. or 14.2 first, then upgrade to 15.1 or later (multiple steps).
13.3 or later	Use upgrade package to upgrade from the current Junos OS release to Junos OS with upgraded FreeBSD (single step).
15.1 or later	Use upgrade package to upgrade from the current Junos OS release to Junos OS with upgraded FreeBSD (single step).



**NOTE:** You can also downgrade from Junos OS Release 15.1 to an earlier release of Junos OS, as long as the path complies with the Junos OS policy of skipping at most two releases earlier.

4. Understand that direct validation of running configuration does not work for upgrading to Junos OS with upgraded FreeBSD from Junos OS based on older versions of the FreeBSD kernel.

When upgrading or downgrading between Junos OS and Junos OS with upgraded FreeBSD, you might have to validate on a different host. It does not matter where that other host is, as long as you can reach it with NETCONF over SSH. See *Establishing an SSH Connection for a NETCONF Session*. The target system uses the network to contact the other host, run the validation and authentication, and return the result.

The upgrade process only preserves the following directories:

- `/config`
- `/etc/localtime`
- `/var/db`
- `/var/etc/master.passwd`
- `/var/etc/inetd.conf`
- `/var/etc/pam.conf`
- `/var/etc/resolv.conf`

- `/var/etc/syslog.conf`
- `/var/etc/localtime`
- `/var/etc/exports`
- `/var/etc/extensions.allow`
- `/var/preserve`
- `/var/tmp/baseline-config.conf`
- `/var/tmp/preinstall_boot_loader.conf`



**NOTE:** On EX2300 and EX3400 switches, the following directories are not applicable:

- `/etc/localtime`
- `/var/etc/localtime`
- `/var/etc/exports`
- `/var/preserve`
- `/var/tmp/preinstall_boot_loader.conf`

For specific installation procedures, see the following:

- [To Install Junos OS with Upgraded FreeBSD Over a Plain Junos OS on page 70](#)
- [To Install Junos OS with Upgraded FreeBSD Over Junos OS with Upgraded FreeBSD of an Earlier Release on page 73](#)
- [To Install Junos OS with Upgraded FreeBSD Over Junos OS with Upgraded FreeBSD of a Later Release on page 74](#)

## To Install Junos OS with Upgraded FreeBSD Over a Plain Junos OS



**NOTE:** If you have important files in other directories, copy them from the router or switch to a secure location before upgrading the router or switch.



**NOTE:** The following procedure refers to routers, but it also applies to switches.

To install Junos OS with upgraded FreeBSD over a plain Junos OS:

1. Enter the **request system software add *package-name* no-validate** command from the operational mode in the CLI:



**NOTE:** The **no-copy** option is enabled by default.

Use the **no-validate** option with the **request system software add** command. If you leave out the **no-validate** option, the command uses the **validate** option by default, and direct validation of running configuration does not work for upgrading to Junos OS with upgraded FreeBSD from Junos OS based on older versions of the FreeBSD kernel.



**NOTE:** You can also use **reboot** option along with **request system software add** command, but it is not recommended to do this in a single step while upgrading from a FreeBSD 6.1 based Junos OS to FreeBSD 10 based Junos OS.



**NOTE:** To validate current configuration on an upgrade to Junos OS with upgraded FreeBSD from Junos OS, use the **request system software validate on (Junos OS with Upgraded FreeBSD)** command.

```
user@host>request system software add
/var/tmp/junos-install-mx-x86-32-15.1R1.9.tgz no-validate
Installing package '/var/tmp/junos-install-mx-x86-32-15.1R1.9.tgz' ...
Verified manifest signed by PackageProductionEc_2015
Verified manifest signed by PackageProductionRSA_2015
Verified contents.iso
Verified issu-indb.tgz
Verified junos-x86-32.tgz
Verified kernel
Verified metatags
Verified package.xml
Verified pkgtools.tgz
camcontrol: not found
camcontrol: not found
Verified manifest signed by PackageProductionEc_2015
Saving the config files ...
NOTICE: uncommitted changes have been saved in
/var/db/config/juniper.conf.pre-install
Saving package file in
/var/sw/pkg/junos-install-x86-32-domestic-20150618.043753_builder_junos_151_r1.tgz
...
Saving state for rollback ...
```

The new Junos OS image is installed on the router.

2. Reboot the device to start the new software using the **request system reboot** command:

```
user@host> request system reboot
Reboot the system? [yes, no] (no) yes
```



**NOTE:** You must reboot the device to load the newly installed version of Junos OS on the device.

To abort the installation, do not reboot the device. Instead, finish the installation and then issue the `request system software delete package-name` command where package is, for example, `junos-install-mx-x86-32-15.1R1.9.tgz`. This is your last chance to stop the installation (not applicable on EX2300 and EX3400 platforms).

The software is loaded when you reboot the system. Installation can take between 5 and 10 minutes. The device then reboots from the boot device on which the software was just installed. When the reboot is complete, the device displays the login prompt.

While the software is being upgraded, the Routing Engine on which you are performing the installation does not route traffic.

3. Log in and issue the **show version** command to verify the version of the software installed.

```
user@host> show version
Hostname: host
Model: mx240
Junos: 15.1R1.9
JUNOS OS Kernel 32-bit [20150617.306001_builder_stable_10]
JUNOS OS runtime [20150617.306001_builder_stable_10]
JUNOS OS time zone information [20150617.306001_builder_stable_10]
JUNOS py base [20150618.043753_builder_junos_151_r1]
JUNOS OS crypto [20150617.306001_builder_stable_10]
JUNOS network stack and utilities [20150618.043753_builder_junos_151_r1]
JUNOS libs [20150618.043753_builder_junos_151_r1]
JUNOS runtime [20150618.043753_builder_junos_151_r1]
JUNOS platform support [20150618.043753_builder_junos_151_r1]
JUNOS modules [20150618.043753_builder_junos_151_r1]
JUNOS daemons [20150618.043753_builder_junos_151_r1]
JUNOS Voice Services Container package [20150618.043753_builder_junos_151_r1]
JUNOS Services SSL [20150618.043753_builder_junos_151_r1]
JUNOS Services Stateful Firewall [20150618.043753_builder_junos_151_r1]
JUNOS Services RPM [20150618.043753_builder_junos_151_r1]
JUNOS Services PTSP Container package [20150618.043753_builder_junos_151_r1]
JUNOS Services NAT [20150618.043753_builder_junos_151_r1]
JUNOS Services Mobile Subscriber Service Container package
[20150618.043753_builder_junos_151_r1]
JUNOS Services MobileNext Software package
[20150618.043753_builder_junos_151_r1]
JUNOS Services LL-PDF Container package [20150618.043753_builder_junos_151_r1]
JUNOS Services Jflow Container package [20150618.043753_builder_junos_151_r1]
JUNOS Services IPSec [20150618.043753_builder_junos_151_r1]
JUNOS IDP Services [20150618.043753_builder_junos_151_r1]
JUNOS Services HTTP Content Management package
[20150618.043753_builder_junos_151_r1]
JUNOS Services Crypto [20150618.043753_builder_junos_151_r1]
JUNOS Services Captive Portal and Content Delivery Container package
[20150618.043753_builder_junos_151_r1]
```



JUNOS Border Gateway Function package [20150618.043753\_builder\_junos\_151\_r1]  
 JUNOS Appld Services [20150618.043753\_builder\_junos\_151\_r1]  
 JUNOS Services Application Level Gateways [20150618.043753\_builder\_junos\_151\_r1]  
 JUNOS Services AACL Container package [20150618.043753\_builder\_junos\_151\_r1]  
 JUNOS Packet Forwarding Engine Support (MX/EX92XX Common)  
 [20150618.043753\_builder\_junos\_151\_r1]  
 JUNOS Packet Forwarding Engine Support (M/T Common)  
 [20150618.043753\_builder\_junos\_151\_r1]  
 JUNOS Online Documentation [20150618.043753\_builder\_junos\_151\_r1]  
 JUNOS FIPS mode utilities [20150618.043753\_builder\_junos\_151\_r1]



**NOTE:** The output shows the OS kernel, OS runtime, and other packages installed on the router.

## To Install Junos OS with Upgraded FreeBSD Over Junos OS with Upgraded FreeBSD of an Earlier Release



**NOTE:** If you have important files in other directories, copy them from the router or switch to a secure location before upgrading the router or switch.



**NOTE:** The following procedure refers to routers, but it also applies to switches.

To install Junos OS with upgraded FreeBSD over Junos OS with upgraded FreeBSD of an earlier release:

1. Enter the **request system software add *package-name* validate reboot** command from the operational mode in the CLI:



**NOTE:** The **no-copy** option is enabled by default.

Use the **validate** and **reboot** options with the **request system software add** command. The command uses the **validate** option by default. We encourage users to validate using the **validate** option when upgrading from Junos OS to Junos OS or from Junos OS with upgraded FreeBSD to Junos OS with upgraded FreeBSD.

If you leave out the **reboot** option, you can take care of that in a separate reboot step.

The new Junos OS image is installed on the router.

2. Verify the installation of Junos OS with upgraded FreeBSD.

```
user@host> show version
```



**NOTE:** The output shows the OS kernel, OS runtime, and other packages installed on the router.

## To Install Junos OS with Upgraded FreeBSD Over Junos OS with Upgraded FreeBSD of a Later Release



**NOTE:** If you have important files in other directories, copy them from the router or switch to a secure location before upgrading the router or switch.



**NOTE:** The following procedure refers to routers, but it also applies to switches.

To install Junos OS with upgraded FreeBSD over Junos OS with upgraded FreeBSD of a later release:

1. Enter the **request system software add *package-name* validate reboot** command from the operational mode in the CLI:



**NOTE:** The **no-copy** option is enabled by default.

Use the **validate** and **reboot** options with the **request system software add** command. The command uses the **validate** option by default. We encourage users to validate using the **validate** option when upgrading from Junos OS to Junos OS or from Junos OS with upgraded FreeBSD to Junos OS with upgraded FreeBSD.

If you leave out the **reboot** option, you can take care of that in a separate reboot step.

The new Junos OS image is installed on the router.

2. Verify the installation of Junos OS with upgraded FreeBSD.

```
user@host> show version
```



**NOTE:** The output shows the OS kernel, OS runtime, and other packages installed on the router.

### Related Documentation

- [Downgrading Junos OS from Upgraded FreeBSD](#)
- [Understanding Junos OS with Upgraded FreeBSD](#)
- [request system snapshot \(Junos OS with Upgraded FreeBSD\) on page 123](#)
- [request system reboot \(Junos OS with Upgraded FreeBSD\) on page 125](#)

## Understanding Junos OS with Upgraded FreeBSD Snapshots

Starting with Junos OS Release 15.1, certain hardware platforms have two types of snapshots. These platforms run a Junos OS based on an upgraded FreeBSD kernel instead of older versions of FreeBSD. The two types of snapshots have different content, locations, and purposes, so it is important that they are created and maintained properly. One major change is the distinction between recovery snapshots and non-recovery snapshots. The hardware platforms listed in the table in *Understanding Junos OS with Upgraded FreeBSD* have these two different types of snapshots.

Recovery snapshots are full copies of the packages and configuration taken at the time the snapshot command is issued. Recovery snapshots reside on the OAM volume or USB medium. Recovery snapshots take some time to complete because of the level of detail captured. Recovery snapshots can be used to recover the Junos OS volume. There is only ever one recovery snapshot on the system.

On the other hand, non-recovery snapshots are snapshots residing on the Junos OS volume that refer to the current running set of packages and a copy of the configuration at the time the snapshot command is issued. Non-recovery snapshots do not need to copy the whole Junos OS installation and so are very fast. They also consume little space, except for the **config.tgz** file. Non-recovery snapshots can be requested as the boot image for the next reboot. You can rename non-recovery snapshots and retain more than one. You rename the non-recovery snapshots with the same procedure used to rename any other file on the system.



**NOTE:** We recommend that you generate both a non-recovery and a recovery snapshot after you successfully upgrade to Junos OS with upgraded FreeBSD. These snapshots should be refreshed periodically.

Package sets relate to non-recovery and recovery snapshots. The **/active**, **/pending**, and **/previous** sets are all package sets. A non-recovery snapshot is also a package set in a sense, with the addition of a copy of the configuration at the time that the non-recovery snapshot is taken.

Packages that are no longer referenced by any package set or non-recovery snapshot are automatically deleted. We recommend deleting any old non-recovery snapshots after an upgrade so that old packages can be deleted and space recovered.

Some helpful commands for non-recovery snapshots are:

- **request system snapshot**—Use this command to create a non-recovery snapshot.
- **show system snapshot**—Use this command to list all the available non-recovery snapshots.

- **request system snapshot delete**—Use this command to delete a non-recovery snapshot.
- **request system snapshot recovery**—Use this command to create a recovery snapshot. You can use other parameters to determine the details of the recovery snapshot created. There is only ever one recovery snapshot on the system.

**Related  
Documentation**

- [request system snapshot \(Junos OS with Upgraded FreeBSD\) on page 123](#)
- [show system snapshot \(Junos OS with Upgraded FreeBSD\) on page 173](#)
- [request system reboot \(Junos OS with Upgraded FreeBSD\) on page 125](#)
- *request system software validate on (Junos OS with Upgraded FreeBSD)*
- *Understanding Junos OS with Upgraded FreeBSD Package Names*
- [Understanding Junos OS with Upgraded FreeBSD Package Names for EX2300 and EX3400 Switches on page 66](#)
- [Understanding Junos OS with Upgraded FreeBSD Disk Volumes on page 67](#)

## PART 2

# Installing and Managing Licenses

- [Software License Overview on page 79](#)
- [Installing and Managing Software Licenses on page 89](#)



## CHAPTER 5

# Software License Overview

- [Understanding Software Licenses for EX Series Switches on page 79](#)
- [License Key Components for the EX Series Switch on page 88](#)

### Understanding Software Licenses for EX Series Switches

To enable and use some of the Juniper Networks operating system (Junos OS) features, you must purchase, install, and manage separate software licenses. If the switch has the appropriate software license, you can configure and use these features.

The Junos OS feature license (that is, the purchased authorization code) is universal. However, to conform to Junos OS feature licensing requirements, you must install a unique license key (a combination of the authorization code and the switch's serial number) on each switch.

For a Virtual Chassis deployment, two license keys are recommended for redundancy—one for the device in the master role and the other for the device in the backup role:

- In an EX8200 Virtual Chassis, the devices in the master and backup roles are always XRE200 External Routing Engines.
- In all other Virtual Chassis, the devices in the master and backup roles are switches.

You do not need additional license keys for Virtual Chassis member switches that are in the linecard role or for the redundant Routing Engine (RE) modules or the redundant Switch Fabric and Routing Engine (SRE) modules in an EX8200 member switch.

This topic describes:

- [Purchasing a Software Feature License on page 80](#)
- [Features Requiring a License on EX2200 Switches on page 80](#)
- [Features Requiring a License on EX2300 Switches on page 81](#)
- [Features Requiring a License on EX3300 Switches on page 82](#)
- [Features Requiring a License on EX3400 Switches on page 83](#)
- [Features Requiring a License on EX4300 Switches on page 84](#)
- [Features Requiring a License on EX4600 Switches on page 85](#)

- [Features Requiring a License on EX3200, EX4200, EX4500, EX4550, EX6200, EX8200, and EX9200 Switches on page 86](#)
- [License Warning Messages on page 87](#)

## Purchasing a Software Feature License

The following sections list features that require separate licenses. To purchase a software license, contact your Juniper Networks sales representative (<http://www.juniper.net/us/en/contact-us/sales-offices>). You will be asked to supply the chassis serial number of your switch; you can obtain the serial number by running the **show chassis hardware** command.



**NOTE:** You are required to provide the 12-digit serial number when purchasing a license for an XRE200 External Routing Engine in an EX8200 Virtual Chassis.

The serial number listed on the XRE200 External Routing Engine serial ID label is 16 digits long. Use the last 12 digits of the 16-digit serial number to purchase the license.

You can use the **show chassis hardware** command output to display the 12-digit serial number of the XRE200 External Routing Engine.

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## Features Requiring a License on EX2200 Switches

For EX2200 switches, the following features can be added to basic Junos OS by installing an enhanced feature license (EFL):

- Bidirectional Forwarding Detection (BFD)
- Connectivity fault management (IEEE 802.1ag)
- IGMP (Internet Group Management Protocol) version 1 (IGMPv1), IGMPv2, and IGMPv3
- OSPFv1/v2 (with four active interfaces)
- Protocol Independent Multicast (PIM) dense mode, PIM source-specific mode, PIM sparse mode
- Q-in-Q tunneling (IEEE 802.1ad)
- Real-time performance monitoring (RPM)
- Virtual Router
- Virtual Router Redundancy Protocol (VRRP)

[Table 12 on page 81](#) lists the EFLs that you can purchase for EX2200 switch models. If you have the license, you can run all of the enhanced software features mentioned above on your EX2200 switch.



**Table 12: Junos OS EFL Part Number on EX2200 Switches**

Switch Model	EFL Part Number
EX2200-C-12P-2G EX2200-C-12T-2G	EX-12-EFL
EX2200-24T-4G EX2200-24P-4G EX2200-24T-DC-4G	EX-24-EFL
EX2200-48T-4G EX2200-48P-4G	EX-48-EFL

### Features Requiring a License on EX2300 Switches

EX2300 switches has an enhanced feature licenses (EFLs).

To use the following features on the EX2300 switches, you must install an EFL:

- Bidirectional Forwarding Detection (BFD)
- IGMP (Internet Group Management Protocol) version 1 (IGMPv1), IGMPv2, and IGMPv3
- IPv6 routing protocols: Multicast Listener Discovery version 1 and 2 (MLD v1/v2), OSPFv3, PIM multicast, VRRPv6
- Multicast Source Discovery protocol (MSDP)
- OSPF v2/v3
- Protocol Independent Multicast (PIM) dense mode, PIM source-specific mode, PIM sparse mode
- Real-time performance monitoring (RPM)
- RIPng
- Virtual Router Redundancy Protocol (VRRP)

[Table 13 on page 81](#) lists the EFLs that you can purchase for EX2300 switch models. If you have the license, you can run all of the enhanced software features mentioned above on your EX2300 switch.

**Table 13: Junos OS EFL Part Number on EX2300 Switches**

Switch Model	EFL Part Number
EX2300-24T EX2300-24P EX2300-C-12P EX2300-C-12T	EX-24-EFL

## Features Requiring a License on EX3300 Switches

Two types of licenses are available on EX3300 switches: enhanced feature licenses (EFLs) and advanced feature licenses (AFLs).

To use the following features on the EX3300 switches, you must install an EFL:

- Bidirectional Forwarding Detection (BFD)
- IGMP (Internet Group Management Protocol) version 1 (IGMPv1), IGMPv2, and IGMPv3
- IPv6 routing protocols: Multicast Listener Discovery version 1 and 2 (MLD v1/v2), OSPFv3, PIM multicast, VRRPv6, virtual router support for unicast and filter-based forwarding (FBF)
- OSPFv1/v2
- Protocol Independent Multicast (PIM) dense mode, PIM source-specific mode, PIM sparse mode
- Q-in-Q tunneling (IEEE 802.1ad)
- Real-time performance monitoring (RPM)
- Virtual Router
- Virtual Router Redundancy Protocol (VRRP)

Table 14 on page 82 lists the EFLs that you can purchase for EX3300 switch models. If you have the license, you can run all of the enhanced software features mentioned above on your EX3300 switch.

**Table 14: Junos OS EFL Part Number on EX3300 Switches**

Switch Model	EFL Part Number
EX3300-24T EX3300-24P EX3300-24T-DC	EX-24-EFL
EX3300-48T EX3300-48T-BF EX3300-48P	EX-48-EFL

To use the following feature on EX3300 switches, you must install an AFL:

- Border Gateway Protocol (BGP) and multiprotocol BGP (MBGP)
- IPv6 routing protocols: IPv6 BGP and IPv6 for MBGP
- Virtual routing and forwarding (VRF) BGP

Table 15 on page 83 lists the AFLs that you can purchase for EX3300 switch models. For EX3300 switches, you must purchase and install a corresponding EFL along with the AFL to enable the advanced license features. If you have both these licenses, you can run all of the advanced software features mentioned above on your EX3300 switch.

Table 15: Junos OS AFL Part Number on EX3300 Switches

Switch Model	AFL Part Number
EX3300-24T EX3300-24P EX3300-24T-DC	EX-24-AFL
EX3300-48T EX3300-48T-BF EX3300-48P	EX-48-AFL

### Features Requiring a License on EX3400 Switches

EX3400 switches has an enhanced feature licenses (EFLs) and MACSec license.

To use the following features on the EX3400 switches, you must install an EFL:

- Bidirectional Forwarding Detection (BFD)
- IGMP (Internet Group Management Protocol) version 1 (IGMPv1), IGMPv2, and IGMPv3
- IPv6 routing protocols: : Multicast Listener Discovery version 1 and 2 (MLD v1/v2), OSPFv3, PIM multicast, VRRPv6, virtual router support for unicast and filter-based forwarding (FBF)
- Multicast Source Discovery Protocol (MSDP)
- OSPF v2/v3
- Protocol Independent Multicast (PIM) dense mode, PIM source-specific mode, PIM sparse mode
- Real-time performance monitoring (RPM)
- RIPvng
- Unicast reverse-path forwarding (RPF)
- Virtual Router
- Virtual Router Redundancy Protocol (VRRP)

Table 16 on page 83 lists the EFLs that you can purchase for EX3400 switch models. If you have the license, you can run all of the enhanced software features mentioned above on your EX3400 switch.

Table 16: Junos OS EFL Part Number on EX3400 Switches

Switch Model	EFL Part Number
EX3400-24T EX3400-24P	EX-24-EFL
EX3400-48T EX3400-48P EX3400-48T-AFI	EX-48-EFL

## Features Requiring a License on EX4300 Switches

Two types of licenses are available on EX4300 switches: enhanced feature licenses (EFLs) and advanced feature licenses (AFLs).

To use the following features on the EX4300 switches, you must install an EFL:

- Bidirectional Forwarding Detection (BFD)
- Connectivity fault management (IEEE 802.1ag)
- IGMP (Internet Group Management Protocol) version 1 (IGMPv1), IGMPv2, and IGMPv3
- Multicast Source Discovery Protocol (MSDP)
- OSPFv2/v3
- Protocol Independent Multicast (PIM) dense mode, PIM source-specific mode, PIM sparse mode
- Real-time performance monitoring (RPM)
- RIPng (RIP next generation)
- Unicast reverse-path forwarding (RPF)
- Virtual Router
- Virtual Router Redundancy Protocol (VRRP)

[Table 17 on page 84](#) lists the EFLs that you can purchase for EX4300 switch models. If you have the license, you can run all of the enhanced software features mentioned above on your EX4300 switch.

**Table 17: Junos OS EFL Part Number on EX4300 Switches**

Switch Model	EFL Part Number
EX4300-24T EX4300-24P	EX4300-24-EFL
EX4300-48P EX4300-48T EX4300-48T-AFI EX4300-48T-DC EX4300-48T-DC-AFI	EX4300-48-EFL
EX4300-32F EX4300-32F-DC	EX4300-32F-EFL

To use the following features on EX4300 switches, you must install an AFL:

- Border Gateway Protocol (BGP) and multiprotocol BGP (MBGP)
- Intermediate System-to-Intermediate System (IS-IS)

Table 18 on page 85 lists the AFLs that you can purchase for EX4300 switch models. For EX4300 switches, you must purchase and install a corresponding EFL along with the AFL to enable the advanced license features. If you have both these licenses, you can run all of the advanced software features mentioned above on your EX4300 switch.

**Table 18: Junos OS AFL Part Number on EX4300 Switches**

Switch Model	AFL Part Number
EX4300-24T EX4300-24P	EX4300-24-AFL
EX4300-48P EX4300-48T EX4300-48T-AFI EX4300-48T-DC EX4300-48T-DC-AFI	EX4300-48-AFL
EX4300-32F EX4300-32F-DC	EX4300-32F-AFL

You must download a MACsec feature license to enable MACsec. The MACsec feature license is an independent feature license; the enhanced feature licenses (EFLs) or advanced feature licenses (AFLs) that must be purchased to enable some features on EX Series switches cannot be purchased to enable MACsec.

To purchase a feature license for MACsec, contact your Juniper Networks sales representative (<http://www.juniper.net/us/en/contact-us/sales-offices>). The Juniper sales representative will provide you with a feature license file and a license key.

MACsec is supported on EX4300 switches.

## Features Requiring a License on EX4600 Switches

To use the following features on EX4600 switches, you must install an advanced feature license:

- Border Gateway Protocol (BGP) and multiprotocol BGP (MBGP)
- Intermediate System-to-Intermediate System (IS-IS)
- Multiprotocol Label Switching (MPLS)

Table 19 on page 85 lists the AFLs that you can purchase for EX4600 switch models.

**Table 19: Junos OS AFL Part Number on EX4600 Switches**

Switch Model	AFL Part Number
EX4600-40F	EX4600-AFL

You must download a MACsec feature license to enable MACsec. The MACsec feature license is an independent feature license; the enhanced feature licenses (EFLs) or

advanced feature licenses (AFLs) that must be purchased to enable some features on EX Series switches cannot be purchased to enable MACsec.

To purchase a feature license for MACsec, contact your Juniper Networks sales representative (<http://www.juniper.net/us/en/contact-us/sales-offices>). The Juniper sales representative will provide you with a feature license file and a license key.

MACsec is supported on EX4600 switches.

## Features Requiring a License on EX3200, EX4200, EX4500, EX4550, EX6200, EX8200, and EX9200 Switches

To use the following features on EX3200, EX4200, EX4500, EX4550, EX8200, and EX9200 switches, you must install an advanced feature license (AFL):

- Border Gateway Protocol (BGP) and multiprotocol BGP (MBGP)
- Ethernet VPN (available only on EX9200 switches)
- Intermediate System-to-Intermediate System (IS-IS)
- IPv6 routing protocols: IS-IS for IPv6, IPv6 BGP, IPv6 for MBGP
- Logical systems (available only on EX9200 switches)
- MPLS with RSVP-based label-switched paths (LSPs) and MPLS-based circuit cross-connects (CCCs) (Not supported on EX9200 switches)
- Open vSwitch Database (OVSDb) (available only on EX9200 switches)
- Virtual Extensible LAN (VXLAN) (available only on EX9200 switches)

To use the following features on Juniper Networks EX6200 Ethernet Switches, you must install an advanced feature license (AFL):

- Border Gateway Protocol (BGP)
- Intermediate System-to-Intermediate System (IS-IS)
- IPv6 routing protocols: IS-IS for IPv6, IPv6 BGP

Table 20 on page 86 lists the AFLs that you can purchase for EX3200, EX4200, EX4500, EX4550, EX6200, EX8200, and EX9200 switches. If you have the license, you can run all of the advanced software features mentioned above on your EX3200, EX4200, EX4500, EX4550, EX6200, EX8200, or EX9200 switch.

**Table 20: Junos OS AFL Part Number on EX3200, EX4200, EX4500, EX4550, EX6200, EX8200, and EX9200 Switches**

Switch Model	AFL Part Number
EX3200-24P EX3200-24T EX4200-24F EX4200-24P EX4200-24PX EX4200-24T	EX-24-AFL

**Table 20: Junos OS AFL Part Number on EX3200, EX4200, EX4500, EX4550, EX6200, EX8200, and EX9200 Switches (*continued*)**

Switch Model	AFL Part Number
EX3200-48P EX3200-48T EX4200-48F EX4200-48P EX4200-48PX EX4200-48T	EX-48-AFL
EX4500-40F-BF EX4500-40F-BF-C EX4500-40F-FB EX4500-40F-FB-C	EX-48-AFL
EX4550	EX4550-AFL
EX6210	EX6210-AFL
EX8208	EX8208-AFL
EX8216	EX8216-AFL
EX-XRE200	EX-XRE200-AFL
EX9204	EX9204-AFL
EX9208	EX9208-AFL
EX9214	EX9214-AFL

You must download a MACsec feature license to enable MACsec. The MACsec feature license is an independent feature license; the enhanced feature licenses (EFLs) or advanced feature licenses (AFLs) that must be purchased to enable some features on EX Series switches cannot be purchased to enable MACsec.

To purchase a feature license for MACsec, contact your Juniper Networks sales representative (<http://www.juniper.net/us/en/contact-us/sales-offices>). The Juniper sales representative will provide you with a feature license file and a license key.

MACsec is supported on EX4200 and EX4550 switches.

### License Warning Messages

For using features that require a license, you must install and configure a license key. To obtain a license key, use the contact information provided in your certificate.

If you have not purchased the AFL or EFL and installed the license key, you receive warnings when you try to commit the configuration:

```
[edit protocols]
  'bgp'
```

```
warning: requires 'bgp' license
error: commit failed: (statements constraint check failed)
```

The system generates system log (**syslog**) alarm messages notifying you that the feature requires a license—for example:

```
Sep 3 05:59:11 craftd[806]: Minor alarm set, BGP Routing Protocol usage
requires a license
Sep 3 05:59:11 alarmd[805]: Alarm set: License color=YELLOW, class=CHASSIS,
reason=BGP Routing Protocol usage requires a license
Sep 3 05:59:11 alarmd[805]: LICENSE_EXPIRED: License for feature bgp(47) expired
```

Output of the **show system alarms** command displays the active alarms:

```
user@switch> show system alarms
1 alarm currently active
Alarm time          Class  Description
2009-09-03 06:00:11 UTC Minor  BGP Routing Protocol usage requires a license
```

**Related  
Documentation**

- [Managing Licenses for the EX Series Switch \(CLI Procedure\) on page 89](#)
- [Managing Licenses for the EX Series Switch \(J-Web Procedure\) on page 90](#)
- [Monitoring Licenses for the EX Series Switch on page 92](#)
- [License Key Components for the EX Series Switch on page 88](#)

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## License Key Components for the EX Series Switch

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When you purchase a license for a Junos OS feature that requires a separate license, you receive a license key.

A license key consists of two parts:

- License ID—Alphanumeric string that uniquely identifies the license key. When a license is generated, it is given a license ID.
- License data—Block of binary data that defines and stores all license key objects.

For example, in the following typical license key, the string **Junos204558** is the license ID, and the trailing block of data is the license data:

```
Junos204558 aeaqea qmijhd amrqha ztfmbu gqzama uqceds
ra32zr lsevik ftvjed o4jy5u fynzzj mgviyl
kgioyf ardb5g sj7wnt rsfkd wbjf5a sg
```

The license data defines the device ID for which the license is valid and the version of the license.

**Related  
Documentation**

- [Managing Licenses for the EX Series Switch \(CLI Procedure\) on page 89](#)
- [Managing Licenses for the EX Series Switch \(J-Web Procedure\) on page 90](#)
- [Understanding Software Licenses for EX Series Switches on page 79](#)



## CHAPTER 6

# Installing and Managing Software Licenses

- [Managing Licenses for the EX Series Switch \(CLI Procedure\) on page 89](#)
- [Managing Licenses for the EX Series Switch \(J-Web Procedure\) on page 90](#)
- [Monitoring Licenses for the EX Series Switch on page 92](#)

### Managing Licenses for the EX Series Switch (CLI Procedure)

---

To enable and use some Junos OS features on an EX Series switch, you must purchase, install, and manage separate software licenses. Each switch requires one license. For a Virtual Chassis deployment, two licenses are recommended for redundancy. After you have configured the features, you see a warning message if the switch does not have a license for the feature.

Before you begin managing licenses, be sure that you have:

- Obtained the needed licenses. For information about how to purchase software licenses, contact your Juniper Networks sales representative.
- Understand what makes up a license key. For more information, see [“License Key Components for the EX Series Switch” on page 88](#).

This topic includes the following tasks:

- [Adding New Licenses on page 89](#)
- [Deleting Licenses on page 90](#)
- [Saving License Keys on page 90](#)

### Adding New Licenses

To add one or more new license keys on the switch, with the CLI:

1. Add the license key or keys:
  - To add one or more license keys from a file or URL, specify the filename of the file or the URL where the key is located:  

```
user@switch> request system license add filename | url
```
  - To add a license key from the terminal:

```
user@switch> request system license add terminal
```

2. When prompted, enter the license key, separating multiple license keys with a blank line.

If the license key you enter is invalid, an error appears in the CLI output when you press Ctrl+d to exit the license entry mode.

## Deleting Licenses

To delete one or more license keys from the switch with the CLI, specify the license ID:

```
user@switch> request system license delete license-id
```

You can delete only one license at a time.

## Saving License Keys

To save the installed license keys to a file (which can be a URL) or to the terminal:

```
user@switch> request system license save filename | url
```

For example, the following command saves the installed license keys to a file named `license.conf`:

```
user@switch> request system license save ftp://user@switch/license.conf
```

### Related Documentation

- [Managing Licenses for the EX Series Switch \(J-Web Procedure\) on page 90](#)
- [Monitoring Licenses for the EX Series Switch on page 92](#)
- [Understanding Software Licenses for EX Series Switches on page 79](#)

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## Managing Licenses for the EX Series Switch (J-Web Procedure)

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**NOTE:** This topic applies only to the J-Web Application package.

To enable and use some Junos OS features on an EX Series switch, you must purchase, install, and manage separate software licenses. Each switch requires one license. For a Virtual Chassis deployment, two licenses are recommended for redundancy. After you have configured the features, you see a warning message if the switch does not have a license for the feature.

Before you begin managing licenses, be sure that you have:

- Obtained the needed licenses. For information about how to purchase software licenses, contact your Juniper Networks sales representative.
- Understand what makes up a license key. For more information, see [“License Key Components for the EX Series Switch” on page 88](#).

This topic includes the following tasks:

- [Adding New Licenses on page 91](#)
- [Deleting Licenses on page 91](#)

- [Displaying License Keys on page 91](#)
- [Downloading Licenses on page 91](#)

## Adding New Licenses

To add one or more new license keys on the switch, with the J-Web license manager:

1. In the J-Web interface, select **Maintain > Licenses**.
2. Under Installed Licenses, click **Add** to add a new license key or keys.
3. Do *one* of the following, using a blank line to separate multiple license keys:
  - In the License File URL box, type the full URL to the destination file containing the license key or keys to be added.
  - In the License Key Text box, paste the license key text, in plain-text format, for the license to be added.
4. Click **OK** to add the license key or keys.

A list of features that use the license key is displayed. The table also lists the ID, state, and version of the license key.

## Deleting Licenses

To delete one or more license keys from a switch with the J-Web license manager:

1. In the J-Web interface, select **Maintain > Licenses**.
2. Select the check box of the license or licenses you want to delete.
3. Click **Delete**.

## Displaying License Keys

To display the license keys installed on a switch with the J-Web license manager:

1. In the J-Web interface, select **Maintain > Licenses**.
2. Under Installed Licenses, click **Display Keys** to display all the license keys installed on the switch.

A screen displaying the license keys in text format appears. Multiple licenses are separated by a blank line.

## Downloading Licenses

To download the license keys installed on the switch with the J-Web license manager:

1. In the J-Web interface, select **Maintain > Licenses**.
2. Under Installed Licenses, click **Download Keys** to download all the license keys installed on the switch to a single file.
3. Select **Save it to disk** and specify the file to which the license keys are to be written. You can also download the license file to your system.

- Related Documentation**
- [Managing Licenses for the EX Series Switch \(CLI Procedure\) on page 89](#)
  - [Monitoring Licenses for the EX Series Switch on page 92](#)
  - [Understanding Software Licenses for EX Series Switches on page 79](#)

## Monitoring Licenses for the EX Series Switch

---

To enable and use some Junos OS features on the EX Series switch, you must purchase, install, and manage the appropriate software licenses. Each switch requires one license. For a Virtual Chassis deployment, two licenses are recommended for redundancy.

To monitor your installed licenses, perform the following tasks:

- [Displaying Installed Licenses and License Usage Details on page 92](#)
- [Displaying Installed License Keys on page 93](#)

### Displaying Installed Licenses and License Usage Details

**Purpose** Verify that the expected license is installed and active on the switch and fully covers the switch configuration.

**Action** From the CLI, enter the **show system license** command. (To display only the **License usage** list, enter the **show system license usage** command. To display only the **Licenses installed** output, enter **show system license installed**.)

```
user@switch> show system license
License usage:
```

Feature name	Licenses	Licenses	Licenses	Expiry
	used	installed	needed	
bgp	1	1	0	permanent
isis	0	1	0	permanent
ospf3	0	1	0	permanent
ripng	0	1	0	permanent
mpls	0	1	0	permanent

```
Licenses installed:
```

```
License identifier: JUNOS204558
```

```
License version: 2
```

```
Valid for device: BN0208380000
```

```
Features:
```

```

ex-series - Licensed routing protocols in ex-series
permanent

```

**Meaning** The output shows the license or licenses (for Virtual Chassis deployments) installed on the switch and license usage. Verify the following information:

- If a feature that requires a license is configured (used), a license is installed on the switch. The **Licenses needed** column must show that no licenses are required.
- The appropriate number of licenses is installed. Each switch requires one license. For a Virtual Chassis deployment, two licenses are recommended for redundancy.
- The expected license is installed.

## Displaying Installed License Keys

**Purpose** Verify that the expected license keys are installed on the switch.

**Action** From the CLI, enter the **show system license keys** command.

```

user@switch> show system license keys
JUNOS204558 abcdef qhijkl mnopqr stuvwxyz yzabcd efghij
klmnop qrstuv wxyzab cdefgh ijklmn opqrst
uvwxyz 61abcd efgh21 31efgh yzabcd

```

**Meaning** The output shows the license key or keys (for Virtual Chassis deployments) installed on the switch. Verify that each expected license key is present.

- Related Documentation**
- [Managing Licenses for the EX Series Switch \(CLI Procedure\) on page 89](#)
  - [Managing Licenses for the EX Series Switch \(J-Web Procedure\) on page 90](#)
  - [Understanding Software Licenses for EX Series Switches on page 79](#)



## PART 3

# Troubleshooting Information

- [Troubleshooting Procedures on page 97](#)





## CHAPTER 7

# Troubleshooting Procedures

- [Troubleshooting Software Installation on page 97](#)
- [Troubleshooting a Switch That Has Booted from the Backup Junos OS Image on page 100](#)
- [Resilient Dual-Root Partitions Frequently Asked Questions on page 101](#)

## Troubleshooting Software Installation

This topic describes troubleshooting issues with software installations on EX Series switches.

- [Recovering from a Failed Software Upgrade on an EX Series Switch on page 97](#)
- [Rebooting from the Inactive Partition on page 98](#)
- [Freeing Disk Space for Software Installation on page 99](#)
- [Installation from the Boot Loader Generates 'cannot open package' Error on page 99](#)

## Recovering from a Failed Software Upgrade on an EX Series Switch

**Problem**    **Description:** If Junos OS loads but the CLI is not working, or if the switch has no software installed, use this recovery installation procedure to install Junos OS.

**Solution**    If there is already a Junos OS image on the system, you can either install the new Junos OS package in a separate partition and have both Junos OS images remain on the system, or you can wipe the disk clean before the new installation proceeds.

If there is no Junos OS image on the system, follow the instructions in "[Booting an EX Series Switch Using a Software Package Stored on a USB Flash Drive](#)" on page 52 to get an image on the system and boot the switch.

To perform a recovery installation:

1. Power on the switch. The loader script starts.

After the message **Loading /boot/defaults/loader.conf** displays, you are prompted with:

**Hit [Enter] to boot immediately, or space bar for command prompt.**

2. Press the space bar to enter the manual loader. The **loader>** prompt displays.

3. Enter the following command:

```
loader> install [--format] [--external] source
```

where:

- **format**—Use this option to wipe the installation media before installing the software package. If you do not include this option, the system installs the new Junos OS package in a different partition from the partition used by the most recently installed Junos OS package.
- **external**—Use this option to install the software package on an external medium.
- **source**—Represents the name and location of the Junos OS package either on a server on the network or as a file on the USB flash drive:
  - Network address of the server and the path on the server; for example, **tftp://192.171.28/junos/jinstall-ex-4200-9.4R1.5-domestic-signed.tgz**
  - The Junos OS package on a USB device is commonly stored in the root drive as the only file; for example, **file:///jinstall-ex-4200-9.4R1.5-domestic-signed.tgz**

The boot process proceeds as normal and ends with a login prompt.

## Rebooting from the Inactive Partition

**Problem**    **Description:** EX Series switches shipped with Junos OS Release 10.4R2 or earlier have Junos OS loaded on the system disk in partition 1. The first time you upgrade, the new software package is installed in partition 2. When you finish the installation and reboot, partition 2 becomes the active partition. Similarly, subsequent software packages are installed in the inactive partition, which becomes the active partition when you reboot at the end of the installation process.

On switches shipped with Release 10.4R3 and later, the same Junos OS image is loaded in each of the two root partitions, and you should copy the new software image to the alternate partition each time you upgrade.

If you performed an upgrade and rebooted, the system resets the active partition. You can use this procedure to manually boot from the inactive partition.



**NOTE:** If you have completed the installation of the software image but have not yet rebooted, issue the **request system software rollback** command to return to the original software installation package.

**Solution**    Reboot from the inactive partition:

```
user@switch> request system reboot slice alternate
```



**NOTE:** If you cannot access the CLI, you can reboot from the inactive partition using the following procedure from the loader script prompt:

1. Unload and clear the interrupted boot from the active partition:

```
loader> unload
loader> unset vfs.root.mountfrom
```

2. Select the new (inactive) partition to boot from:

```
loader> set currdev=diskxsy:
```

where *x* is either 0 (internal) or 1 (external) and the *y* indicates the number of the inactive partition, either 1 or 2.

You must include the colon (:) at the end of this command.

3. Boot Junos OS from the inactive partition:

```
loader> boot
```

## Freeing Disk Space for Software Installation

**Problem**    **Description:** The software installation process requires a certain amount of unused disk space. If there is not enough space, you might receive an error message such as:

```
fetch: /var/tmp/incoming-package.tgz: No space left on device
```

**Solution**    Identify and delete unnecessary files by using the **request system storage cleanup** command.

## Installation from the Boot Loader Generates 'cannot open package' Error

**Problem**    **Description:** When installing a Junos OS software image from the loader prompt, a "cannot open package error" is generated:

```
loader> install - -format
tftp://10.204.33.248/images/Flash_corr/official/jinstall-ex-4200-10.4I2011012-domestic-signed.tgz
Speed: 1000, full duplex
bootp: no reply
No response for RARP request
net_open: RARP failed
cannot open package (error 5)
```

**Solution**    This might be due to the IP address, gateway IP address, netmask address, or server IP address not being properly set. You can set these values either from the shell or from the u-boot prompt.

To set these values from the shell:

```
% nvram setenv ipaddr 10.204.35.235
% nvram setenv netmask 255.255.240.0
```

```
% nvram setenv gatewayip 10.204.47.254
% nvram setenv serverip 10.204.33.248
```

To set these values from the u-boot prompt, log in to a console connection, reboot, and stop at the u-boot prompt (Cntrl+c):

```
=> setenv ipaddr 10.204.35.235
=> setenv gatewayip 10.204.47.254
=> setenv serverip 10.204.33.248
=> setenv netmask 255.255.240.0
=> saveenv
=> printenv Verify whether variables are set properly or not
=> boot
```

#### Related Documentation

- [Installing Software on an EX Series Switch with a Single Routing Engine \(CLI Procedure\) on page 44](#)
- [Upgrading Software on an EX6200 or EX8200 Standalone Switch Using Nonstop Software Upgrade \(CLI Procedure\)](#)
- [Installing Software on EX Series Switches \(J-Web Procedure\) on page 51](#)
- [Understanding Software Installation on EX Series Switches on page 28](#)
- [show system storage partitions \(EX Series Switches Only\) on page 171](#)

---

## Troubleshooting a Switch That Has Booted from the Backup Junos OS Image

**Problem** **Description:** The switch boots from the backup root file partition. It is possible that the primary copy of JUNOS OS failed to boot properly, which could indicate that it is corrupted. This event is flagged in two ways:

- Upon login through the console or management port, the following warning message is displayed:

```
WARNING: THIS DEVICE HAS BOOTED FROM THE BACKUP JUNOS IMAGE
```

It is possible that the primary copy of JUNOS failed to boot up properly, and so this device has booted from the backup copy.

Please re-install JUNOS to recover the primary copy in case it has been corrupted.

- The following alarm message is generated:

```
user@switch> show chassis alarms
1 alarms currently active
Alarm time          Class  Description
2011-02-17 05:48:49 PST  Minor  Host 0 Boot from backup root
```

If the switch is in a Virtual Chassis, the switch member number appears in the **Description** field, where the switch is called a host.

**Solution** Install a new Junos OS image on the partition that had the corruption, or take a snapshot (use [request system snapshot](#)) of the currently active partition and use it to replace the image in the alternate partition:

If the switch is a standalone switch or a Virtual Chassis master switch, enter this command:

```
user@switch> request system snapshot slice alternate
```

If the switch is a Virtual Chassis member switch (not the master), enter this command on the Virtual Chassis:

```
user@switch> request system snapshot slice alternate member member-id
```

where *member-id* is the Virtual Chassis member ID number.

#### Related Documentation

- [Verifying Junos OS and Boot Loader Software Versions on an EX Series Switch on page 59](#)
- [Troubleshooting Software Installation on page 97](#)
- [show system storage partitions \(EX Series Switches Only\) on page 171](#)

## Resilient Dual-Root Partitions Frequently Asked Questions



**NOTE:** This task uses Junos OS for EX Series switches with support for the Enhanced Layer 2 Software (ELS) configuration style. If your switch runs software that does not support ELS, see *Resilient Dual-Root Partitions Frequently Asked Questions*. For ELS details, see *Getting Started with Enhanced Layer 2 Software*.

This FAQ addresses questions regarding resilient dual-root partitions on EX Series switches. The resilient dual-root partition feature was introduced on EX Series switches at Junos OS Release 10.4R3. It provides additional resiliency for EX Series switches.

This FAQ covers the following questions:

- [What Happens to My Files If the System Detects a File System Corruption and Automatic Snapshot Is Enabled? on page 101](#)
- [What Happens to My Files If the System Detects a File System Corruption and Automatic Snapshot is Not Enabled? on page 102](#)
- [How Will I Be Informed If My Switch Boots from the Alternate Slice Because of Corruption in the Root File System? on page 103](#)

### What Happens to My Files If the System Detects a File System Corruption and Automatic Snapshot Is Enabled?

If the automatic snapshot feature is enabled during a reboot, the system automatically takes a snapshot of Junos OS from the alternate root partition (Slice 2) and copies it onto the primary root partition (Slice 1). The system checks each file system partition for corruption. [Table 21 on page 102](#) shows the action the system takes if corruption is detected and the corrective action that you can take.

**Table 21: Actions If Corrupt Files Are Found and Automatic Snapshot Is Enabled**

Slice 1	Slice 2	Slice 3		Slice 4
s1a	s2a	s3e	s3d	s4d
/	/	/var	/var/tmp	/config
(root Junos OS)	(root Junos OS)			
If a root directory (/) is corrupted, the corrupted file system is not mounted. The switch automatically takes a snapshot of the Junos OS root file system and copies it onto the primary root partition. It boots from the alternate slice, but the next reboot happens from the primary slice.		During early boot, the integrity of /var, /var/tmp, and /config files is verified. If they are corrupted, the corrupted slice is reformatted and the file directory in that slice is lost.		
Corrective action: No corrective action is required.		Corrective action: Restore the /var or /config files from the external backup.		

### What Happens to My Files If the System Detects a File System Corruption and Automatic Snapshot is Not Enabled?

During a reboot, the system checks each file system partition for corruption.

[Table 22 on page 102](#) shows the action the system takes if corruption is detected and the corrective action that you can take.

**Table 22: Actions If Corrupt Files Are Found**

Slice 1	Slice 2	Slice 3		Slice 4
s1a	s2a	s3e	s3d	s4d
/	/	/var	/var/tmp	/config
(root Junos OS)	(root Junos OS)			
If a root directory (/) is corrupted, the corrupted file system is not mounted and the switch boots from the alternate slice.		During early boot, the integrity of /var, /var/tmp, and /config files is verified. If they are corrupted, the corrupted slice is reformatted and the file directory in that slice is lost.		
Corrective action: Issue a <a href="#">request system snapshot</a> command from the good root directory to the corrupted slice.		Corrective action: Restore the /var or /config files from the external backup.		

## How Will I Be Informed If My Switch Boots from the Alternate Slice Because of Corruption in the Root File System?

If the switch detects corruption in the primary root file system, it boots from the alternate root partition. When this occurs, the type of notification depends on whether you have enabled the automatic snapshot feature or not:

- If the automatic snapshot feature is not enabled:

- If you are logged in through the console port or the management port:

```
WARNING: THIS DEVICE HAS BOOTED FROM THE BACKUP JUNOS IMAGE
```

It is possible that the primary copy of JUNOS failed to boot up properly, and so this device has booted from the backup copy.

Please re-install JUNOS to recover the primary copy in case it has been corrupted.

- The following message is displayed when you issue **show chassis alarms**:

```
user@switch> show chassis alarms
1 alarms currently active
Alarm time          Class  Description
2011-02-17 05:48:49 PST  Minor  Host 0 Boot from backup root
```

- If the automatic snapshot feature is enabled:
  - A banner message appears, indicating that an automatic snapshot operation is in progress. The banner message disappears when the snapshot operation is complete.
  - No alarm is issued to indicate that the switch has been rebooted from the alternate partition. However, the switch does log the event.

### Related Documentation

- [Verifying Junos OS and Boot Loader Software Versions on an EX Series Switch on page 59](#)
- [Troubleshooting Software Installation on page 97](#)
- [Troubleshooting a Switch That Has Booted from the Backup Junos OS Image on page 100](#)
- [Verifying Junos OS and Boot Loader Software Versions on an EX Series Switch on page 59](#)





## CHAPTER 8

# Operational Commands

- request system license add
- request system license delete
- request system license save
- request system reboot
- request system reboot
- request system snapshot
- request system snapshot (Junos OS with Upgraded FreeBSD)
- request system reboot (Junos OS with Upgraded FreeBSD)
- request system software add
- request system software delete
- request system software rollback
- request system software validate
- show system auto-snapshot
- show system boot-messages
- show system license
- show system snapshot
- show system storage partitions (EX Series Switches Only)
- show system snapshot (Junos OS with Upgraded FreeBSD)

## request system license add

---

<b>Syntax</b>	<code>request system license add (<i>filename</i>   terminal)</code>
<b>Release Information</b>	Command introduced before Junos OS Release 7.4. Command introduced in Junos OS Release 9.0 for EX Series switches. Command introduced in Junos OS Release 9.5 for SRX Series devices. Command introduced in Junos OS Release 11.1 for the QFX Series.
<b>Description</b>	Add a license key.
<b>Options</b>	<b><i>filename</i></b> —License key from a file or URL. Specify the filename or the URL where the key is located.  <b><i>terminal</i></b> —License key from the terminal.
<b>Required Privilege Level</b>	maintenance
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• <i>Adding New Licenses (CLI Procedure)</i></li></ul>
<b>List of Sample Output</b>	<a href="#">request system license add on page 106</a>
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.

## Sample Output

### request system license add

```
user@host> request system license add terminal
E408408918 aeaqib qcsbj a okbuq rcmxnq vjocwf uxfsta
          z5ufjb kdrmt6 57bimv 2f3ddp qttcdn 627q4a
          jx4s5x hiri
E408408918: successfully added
add license complete (no errors)
```

## request system license delete

---

<b>Syntax</b>	<code>request system license delete ( <i>license-identifier</i>   license-identifier-list [ <i>licenseid001</i> <i>licenseid002</i> <i>licenseid003</i> ]   all )</code>
<b>Release Information</b>	<p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Command introduced in Junos OS Release 11.1 for the QFX Series.</p> <p>Option <b>license-identifier-list</b> introduced in Junos OS Release 13.1.</p>
<b>Description</b>	Delete a license key. You can choose to delete one license at a time, all licenses at once, or a list of license identifiers enclosed in brackets.
<b>Options</b>	<p><b>license-identifier</b>—Text string that uniquely identifies a license key.</p> <p><b>license-identifier-list [ <i>licenseid001</i> <i>licenseid002</i> <i>licenseid003</i>.... ]</b>—Delete multiple license identifiers as a list enclosed in brackets.</p> <p><b>all</b>—Delete all licenses on the device.</p>
<b>Required Privilege Level</b>	maintenance
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• <i>Deleting a License (CLI Procedure)</i></li> </ul>

## request system license save

---

<b>Syntax</b>	<code>request system license save (<i>filename</i>   terminal)</code>
<b>Release Information</b>	Command introduced before Junos OS Release 7.4. Command introduced in Junos OS Release 9.0 for EX Series switches. Command introduced in Junos OS Release 11.1 for the QFX Series. Command introduced in Junos OS Release 9.5 for SRX Series devices.
<b>Description</b>	Save installed license keys to a file or URL.
<b>Options</b>	<b><i>filename</i></b> —License key from a file or URL. Specify the filename or the URL where the key is located.  <b><i>terminal</i></b> —License key from the terminal.
<b>Required Privilege Level</b>	maintenance
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• <i>Saving License Keys</i></li></ul>
<b>List of Sample Output</b>	<a href="#">request system license save on page 108</a>
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.

## Sample Output

### request system license save

```
user@host> request system license save ftp://user@host/license.conf
```

## request system reboot

<b>List of Syntax</b>	<a href="#">Syntax on page 109</a> <a href="#">Syntax (EX Series Switches) on page 109</a> <a href="#">Syntax (TX Matrix Router) on page 109</a> <a href="#">Syntax (TX Matrix Plus Router) on page 109</a> <a href="#">Syntax (MX Series Router) on page 109</a>
<b>Syntax</b>	<pre>request system reboot &lt;at <i>time</i>&gt; &lt;both-routing-engines&gt; &lt;in <i>minutes</i>&gt; &lt;media (compact-flash   disk   removable-compact-flash   usb)&gt; &lt;message "<i>text</i>"&gt; &lt;other-routing-engine&gt;</pre>
<b>Syntax (EX Series Switches)</b>	<pre>request system reboot &lt;all-members&gt; &lt;at <i>time</i>&gt; &lt;both-routing-engines&gt; &lt;in <i>minutes</i>&gt; &lt;local&gt; &lt;media (external   internal)&gt; &lt;member <i>member-id</i>&gt; &lt;message "<i>text</i>"&gt; &lt;other-routing-engine&gt; &lt;slice <i>slice</i>&gt;</pre>
<b>Syntax (TX Matrix Router)</b>	<pre>request system reboot &lt;all-chassis   all-lcc   lcc <i>number</i>   scc&gt; &lt;at <i>time</i>&gt; &lt;both-routing-engines&gt; &lt;in <i>minutes</i>&gt; &lt;media (compact-flash   disk)&gt; &lt;message "<i>text</i>"&gt; &lt;other-routing-engine&gt;</pre>
<b>Syntax (TX Matrix Plus Router)</b>	<pre>request system reboot &lt;all-chassis   all-lcc   lcc <i>number</i>   sfc <i>number</i>&gt; &lt;at <i>time</i>&gt; &lt;both-routing-engines&gt; &lt;in <i>minutes</i>&gt; &lt;media (compact-flash   disk)&gt; &lt;message "<i>text</i>"&gt; &lt;other-routing-engine&gt; &lt;partition (1   2   alternate)&gt;</pre>
<b>Syntax (MX Series Router)</b>	<pre>request system reboot &lt;all-members&gt; &lt;at <i>time</i>&gt; &lt;both-routing-engines&gt; &lt;in <i>minutes</i>&gt; &lt;local&gt;</pre>

```
<media (external | internal)>  
<member member-id>  
<message "text">  
<other-routing-engine>
```

**Release Information** Command introduced before Junos OS Release 7.4.  
Option **other-routing-engine** introduced in Junos OS Release 8.0.  
Command introduced in Junos OS Release 9.0 for EX Series switches.  
Option **sfc** introduced for the TX Matrix Plus router in Junos OS Release 9.6.  
Option **both-routing-engines** introduced in Junos OS Release 12.1.

**Description** Reboot the software.

**Options** **none**—Reboot the software immediately.

**all-chassis**—(TX Matrix routers and TX Matrix Plus routers only) (Optional) On a TX Matrix router or TX Matrix Plus router, reboot all routers connected to the TX Matrix or TX Matrix Plus router, respectively.

**all-lcc**—(TX Matrix routers and TX Matrix Plus routers only) (Optional) On a TX Matrix router or TX Matrix Plus router, reboot all line card chassis connected to the TX Matrix or TX Matrix Plus router, respectively.

**all-members**—(EX4200 switches and MX Series routers only) (Optional) Reboot the software on all members of the Virtual Chassis configuration.

**at *time***—(Optional) Time at which to reboot the software, specified in one of the following ways:

- **now**—Stop or reboot the software immediately. This is the default.
- **+*minutes***—Number of minutes from now to reboot the software.
- ***yymmddhhmm***—Absolute time at which to reboot the software, specified as year, month, day, hour, and minute.
- ***hh:mm***—Absolute time on the current day at which to stop the software, specified in 24-hour time.

**both-routing-engines**—(Optional) Reboot both Routing Engines at the same time.

**in *minutes***—(Optional) Number of minutes from now to reboot the software. This option is an alias for the **at +*minutes*** option.

**lcc *number***—(TX Matrix routers and TX Matrix Plus routers only) (Optional) Line-card chassis number.

Replace *number* with the following values depending on the LCC configuration:

- 0 through 3, when T640 routers are connected to a TX Matrix router in a routing matrix.
- 0 through 3, when T1600 routers are connected to a TX Matrix Plus router in a routing matrix.

- 0 through 7, when T1600 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.
- 0, 2, 4, or 6, when T4000 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.

**local**—(EX4200 switches and MX Series routers only) (Optional) Reboot the software on the local Virtual Chassis member.

**media (compact-flash | disk)**—(Optional) Boot medium for next boot.

**media (external | internal)**—(EX Series switches and MX Series routers only) (Optional) Reboot the boot media:

- **external**—Reboot the external mass storage device.
- **internal**—Reboot the internal flash device.

**member *member-id***—(EX4200 switches and MX Series routers only) (Optional) Reboot the software on the specified member of the Virtual Chassis configuration. For EX4200 switches, replace *member-id* with a value from 0 through 9. For an MX Series Virtual Chassis, replace *member-id* with a value of 0 or 1.

**message "*text*"**—(Optional) Message to display to all system users before stopping or rebooting the software.

**other-routing-engine**—(Optional) Reboot the other Routing Engine from which the command is issued. For example, if you issue the command from the master Routing Engine, the backup Routing Engine is rebooted. Similarly, if you issue the command from the backup Routing Engine, the master Routing Engine is rebooted.

**partition**—(TX Matrix Plus routers only) (Optional) Reboot using the specified partition on the boot media. This option has the following suboptions:

- **1**—Reboot from partition 1.
- **2**—Reboot from partition 2.
- **alternate**—Reboot from the alternate partition.

**scc**—(TX Matrix routers only) (Optional) Reboot the Routing Engine on the TX Matrix switch-card chassis. If you issue the command from re0, re0 is rebooted. If you issue the command from re1, re1 is rebooted.

**sfc *number***—(TX Matrix Plus routers only) (Optional) Reboot the Routing Engine on the TX Matrix Plus switch-fabric chassis. If you issue the command from re0, re0 is rebooted. If you issue the command from re1, re1 is rebooted. Replace *number* with 0.

**slice *slice***—(EX Series switches only) (Optional) Reboot a partition on the boot media. This option has the following suboptions:

- **1**—Power off partition 1.
- **2**—Power off partition 2.

- **alternate**—Reboot from the alternate partition.

**Additional Information** Reboot requests are recorded in the system log files, which you can view with the **show log** command (see *show log*). Also, the names of any running processes that are scheduled to be shut down are changed. You can view the process names with the **show system processes** command (see *show system processes*).

On a TX Matrix or TX Matrix Plus router, if you issue the **request system reboot** command on the master Routing Engine, all the master Routing Engines connected to the routing matrix are rebooted. If you issue this command on the backup Routing Engine, all the backup Routing Engines connected to the routing matrix are rebooted.



**NOTE:** Before issuing the **request system reboot** command on a TX Matrix Plus router with no options or the **all-chassis**, **all-lcc**, **lcc number**, or **sfc** options, verify that master Routing Engine for all routers in the routing matrix are in the same slot number. If the master Routing Engine for a line-card chassis is in a different slot number than the master Routing Engine for a TX Matrix Plus router, the line-card chassis might become logically disconnected from the routing matrix after the **request system reboot** command.



**NOTE:** To reboot a router that has two Routing Engines, reboot the backup Routing Engine (if you have upgraded it) first, and then reboot the master Routing Engine.

**Required Privilege Level** maintenance

**Related Documentation**

- *clear system reboot*
- *request system halt*
- [Routing Matrix with a TX Matrix Plus Router Solutions Page](#)

**List of Sample Output**

- [request system reboot on page 113](#)
- [request system reboot \(at 2300\) on page 113](#)
- [request system reboot \(in 2 Hours\) on page 113](#)
- [request system reboot \(Immediately\) on page 113](#)
- [request system reboot \(at 1:20 AM\) on page 113](#)

**Output Fields** When you enter this command, you are provided feedback on the status of your request.



## Sample Output

### request system reboot

```
user@host> request system reboot
Reboot the system ? [yes,no] (no)
```

### request system reboot (at 2300)

```
user@host> request system reboot at 2300 message ?Maintenance time!?
Reboot the system ? [yes,no] (no) yes
```

```
shutdown: [pid 186]
*** System shutdown message from root@berry.network.net ***
System going down at 23:00
```

### request system reboot (in 2 Hours)

The following example, which assumes that the time is 5 PM (17:00), illustrates three different ways to request the system to reboot in two hours:

```
user@host> request system reboot at +120
user@host> request system reboot in 120
user@host> request system reboot at 19:00
```

### request system reboot (Immediately)

```
user@host> request system reboot at now
```

### request system reboot (at 1:20 AM)

To reboot the system at 1:20 AM, enter the following command. Because 1:20 AM is the next day, you must specify the absolute time.

```
user@host> request system reboot at 06060120
request system reboot at 120
Reboot the system at 120? [yes,no] (no) yes
```

## request system reboot

---

<b>Syntax</b>	<pre>request system reboot &lt;all-members   local   member member-id&gt; &lt;at time&gt; &lt;in minutes&gt; &lt;media (external   internal)&gt; &lt;message "text"&gt; &lt;slice (1   2   alternate)&gt;</pre>
<b>Release Information</b>	Command introduced in Junos OS Release 9.0 for EX Series switches. Option <b>partition</b> changed to <b>slice</b> in Junos OS Release 10.0 for EX Series switches.
<b>Description</b>	<p>Reboot the Junos OS.</p> <p>Reboot requests are recorded in the system log files, which you can view with the <b>show log</b> command. You can view the process names with the <b>show system processes</b> command.</p>
<b>Options</b>	<p><b>none</b>—Reboots the software immediately.</p> <p><b>all-members   local   member member-id</b>—(Optional) Specify which member of the Virtual Chassis to reboot:</p> <ul style="list-style-type: none"><li>• <b>all-members</b>—Reboots each switch that is a member of the Virtual Chassis.</li><li>• <b>local</b>—Reboots the local switch, meaning the switch you are logged into, only.</li><li>• <b>member member-id</b>—Reboots the specified member switch of the Virtual Chassis.</li></ul> <p><b>at time</b>—(Optional) Time at which to reboot the software, specified in one of the following ways:</p> <ul style="list-style-type: none"><li>• <b>+minutes</b>—Number of minutes from now to reboot the software.</li><li>• <b>hh:mm</b>—Absolute time on the current day at which to reboot the software, specified in 24-hour time.</li><li>• <b>now</b>—Stop or reboot the software immediately. This is the default.</li><li>• <b>yymmddhhmm</b>—Absolute time at which to reboot the software, specified as year, month, day, hour, and minute.</li></ul> <p><b>in minutes</b>—(Optional) Number of minutes from now to reboot the software. This option is an alias for the <b>at +minutes</b> option.</p> <p><b>media (external   internal)</b>—(Optional) Boot medium for the next boot. The external option reboots the switch using a software package stored on an external boot source, such as a USB flash drive. The internal option reboots the switch using a software package stored in an internal memory source.</p> <p><b>message "text"</b>—(Optional) Message to display to all system users before rebooting the software.</p>

**slice (1 | 2 | alternate)**—(Optional) Reboot using the specified partition on the boot media.

This option has the following suboptions:

- **1**—Reboot from partition 1.
- **2**—Reboot from partition 2.
- **alternate**—Reboot from the alternate partition, which is the partition that did not boot the switch at the last bootup.

**Required Privilege Level** maintenance

**Related Documentation**

- *clear system reboot*

**Output Fields** When you enter this command, you are provided feedback on the status of your request.

## Sample Output

### request system reboot

```
user@host> request system reboot
Reboot the system ? [yes,no] (no)
```

### request system reboot (at 2300)

```
user@host> request system reboot at 2300 message ?Maintenance time!?
Reboot the system ? [yes,no] (no) yes

shutdown: [pid 186]
*** System shutdown message from root@berry.network.net ***
System going down at 23:00
```

### request system reboot (in 2 Hours)

The following example, which assumes that the time is 5 PM (17:00), illustrates three different ways to request the system to reboot in two hours:

```
user@host> request system reboot at +120
user@host> request system reboot in 120
user@host> request system reboot at 19:00
```

### request system reboot (Immediately)

```
user@host> request system reboot at now
```

### request system reboot (at 1:20 AM)

To reboot the system at 1:20 AM, enter the following command. Because 1:20 AM is the next day, you must specify the absolute time.

```
user@host> request system reboot at 06060120
request system reboot at 120
Reboot the system at 120? [yes,no] (no) yes
```

## request system snapshot

---

<b>List of Syntax</b>	<a href="#">Syntax on page 116</a> <a href="#">Syntax (ACX Series Routers) on page 116</a> <a href="#">Syntax (EX Series Switches) on page 116</a> <a href="#">Syntax (MX Series Routers) on page 116</a> <a href="#">Syntax (TX Matrix Routers) on page 116</a> <a href="#">Syntax (TX Matrix Plus Routers) on page 116</a>
<b>Syntax</b>	<code>request system snapshot</code> <code>&lt;partition&gt;</code>
<b>Syntax (ACX Series Routers)</b>	<code>request system snapshot</code> <code>&lt;media type&gt;</code> <code>&lt;partition&gt;</code>
<b>Syntax (EX Series Switches)</b>	<code>request system snapshot</code> <code>&lt;all-members   local   member <i>member-id</i>&gt;</code> <code>&lt;media type&gt;</code> <code>&lt;partition&gt;</code> <code>&lt;re0   re1   routing-engine <i>routing-engine-id</i>&gt;</code> <code>&lt;slice alternate&gt;</code>
<b>Syntax (MX Series Routers)</b>	<code>request system snapshot</code> <code>&lt;all-members&gt;</code> <code>&lt;config-partition&gt;</code> <code>&lt;local&gt;</code> <code>&lt;member <i>member-id</i>&gt;</code> <code>&lt;media <i>usb-port-number</i>&gt;</code> <code>&lt;partition&gt;</code> <code>&lt;root-partition&gt;</code>
<b>Syntax (TX Matrix Routers)</b>	<code>request system snapshot</code> <code>&lt;all-chassis   all-lcc   lcc <i>number</i>   scc&gt;</code> <code>&lt;config-partition&gt;</code> <code>&lt;partition&gt;</code> <code>&lt;root-partition&gt;</code>
<b>Syntax (TX Matrix Plus Routers)</b>	<code>request system snapshot</code> <code>&lt;all-chassis   all-lcc   lcc <i>number</i>   sfc <i>number</i>&gt;</code> <code>&lt;config-partition&gt;</code> <code>&lt;partition&gt;</code> <code>&lt;root-partition&gt;</code>
<b>Release Information</b>	Command introduced before Junos OS Release 7.4. Command introduced in Junos OS Release 10.0 for EX Series switches. Command introduced in Junos OS Release 12.2 for ACX Series switches. Options <code>&lt;config-partition&gt;</code> and <code>&lt;root-partition&gt;</code> introduced in Junos OS Release 13.1 for M, MX, T, TX Series switches. Option <code>media <i>usb-port-number</i></code> introduced in Junos OS Release 13.2 for MX104 routers. Options <code>&lt;config-partition&gt;</code> , <code>&lt;root-partition&gt;</code> , and <code>&lt;slice&gt;</code> deprecated for Junos OS with Upgraded FreeBSD in Junos OS Release 15.1.



**NOTE:** To determine which platforms run Junos OS with Upgraded FreeBSD, see the table listing the platforms currently running Junos OS with upgraded FreeBSD in *Understanding Junos OS with Upgraded FreeBSD*.

- Description**
- On the router, back up the currently running and active file system partitions to standby partitions that are not running. Specifically, the root file system (/) is backed up to **/altroot**, and **/config** is backed up to **/altconfig**. The root and **/config** file systems are on the router's flash drive, and the **/altroot** and **/altconfig** file systems are on the router's hard drive.
  - On the switch, take a snapshot of the files currently used to run the switch—the complete contents of the root (/), **/altroot**, **/config**, **/var**, and **/var-tmp** directories, which include the running Junos OS, the active configuration, and log files.



**CAUTION:** After you run the **request system snapshot** command, you cannot return to the previous version of the software, because the running and backup copies of the software are identical.

**Options** The specific options available depend upon the router or switch:

**none**—Back up the currently running software as follows:

- On the router, back up the currently running and active file system partitions to standby partitions that are not running. Specifically, the root file system (/) is backed up to **/altroot**, and **/config** is backed up to **/altconfig**. The root and **/config** file systems are on the router's flash drive, and the **/altroot** and **/altconfig** file systems are on the router's hard drive.
- On the switch, take a snapshot of the files currently used to run the switch and copy them to the media that the switch did not boot from. If the switch is booted from internal media, the snapshot is copied to external (USB) media. If the switch is booted from external (USB) media, the snapshot is copied to internal media.
- If the snapshot destination is external media but a USB flash drive is not connected, an error message is displayed.
- If the automatic snapshot procedure is already in progress, the command returns the following error: **Snapshot already in progress. Cannot start manual snapshot.** For additional information about the automatic snapshot feature, see [“Understanding Resilient Dual-Root Partitions on Switches” on page 32](#).

**all-chassis | all-lcc | lcc *number*** —(TX Matrix and TX Matrix Plus router only) (Optional)

- **all-chassis**—On a TX Matrix router, archive data and executable areas for all Routing Engines in the chassis. On a TX Matrix Plus router, archive data and executable areas for all Routing Engines in the chassis.

- **all-lcc**—On a TX Matrix router, archive data and executable areas for all T640 routers (or line-card chassis) connected to a TX Matrix router. On a TX Matrix Plus router, archive data and executable areas for all routers (or line-card chassis) connected to a TX Matrix Plus router.
- **lcc *number***—On a TX Matrix router, archive data and executable areas for a specific T640 router (or line-card chassis) that is connected to a TX Matrix router. On a TX Matrix Plus router, archive data and executable areas for a specific router (line-card chassis) that is connected to a TX Matrix Plus router.

Replace *number* with the following values depending on the LCC configuration:

- 0 through 3, when T640 routers are connected to a TX Matrix router in a routing matrix.
- 0 through 3, when T1600 routers are connected to a TX Matrix Plus router in a routing matrix.
- 0 through 7, when T1600 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.
- 0, 2, 4, or 6, when T4000 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.

**all-members | local | member *member-id***—(EX Series switch Virtual Chassis and MX Series routers only) (Optional) Specify where to place the snapshot (archive data and executable areas) in a Virtual Chassis:

- **all-members**—Create a snapshot (archive data and executable areas) for all members of the Virtual Chassis.
- **local**—Create a snapshot (archive data and executable areas) on the member of the Virtual Chassis that you are currently logged into.
- **member *member-id***—Create a snapshot (archive data and executable areas) for the specified member of the Virtual Chassis.

**config-partition**—(M, MX, T, TX Series routers only) Create a snapshot of the configuration partition only and store it onto the default **/altconfig** on the hard disk device or an **/altconfig** on a USB device.

Option deprecated for Junos OS with Upgraded FreeBSD in Junos OS Release 15.1.



**NOTE:** To determine which platforms run Junos OS with Upgraded FreeBSD, see the table listing the platforms currently running Junos OS with upgraded FreeBSD in *Understanding Junos OS with Upgraded FreeBSD*.

---

**media *type***—(ACX Series, M320, T640, MX960 routers, and EX Series switches only)(Optional) Specify the boot device the software is copied to:

- **compact-flash**—Copy software to the primary compact flash drive.
- **external**—(Switches only) Copy software to an external mass storage device, such as a USB flash drive. If a USB drive is not connected, the switch displays an error message.
- **internal**—Copy software to an internal flash drive.
- **removable-compact-flash**—Copy software to the removable compact flash drive.
- **usb**—(ACX Series, M320, T640, MX960 routers only) Copy software to the device connected to the USB port.
- **usb0**—(MX104 routers only) Copy software to the device connected to the USB0 port.
- **usb1**—(MX104 routers only) Copy software to the device connected to the USB1 port.

**partition**—(Optional) Repartition the flash drive before a snapshot occurs. If the partition table on the flash drive is corrupted, the **request system snapshot** command fails and reports errors. The partition option is only supported for restoring the software image from the hard drive to the flash drive.

(Routers only) You cannot issue the request system snapshot command when you enable flash disk mirroring. We recommend that you disable flash disk mirroring when you upgrade or downgrade the software. For more information, see the *Junos OS Administration Library for Routing Devices*.

(EX Series switches only) If the snapshot destination is the media that the switch did not boot from, you must use the **partition** option.

**re0 | re1 | routing-engine routing-engine-id**—(EX6200 and EX8200 switches only) Specify where to place the snapshot in a redundant Routing Engine configuration.

- **re0**—Create a snapshot on Routing Engine 0.
- **re1**—Create a snapshot on Routing Engine 1.
- **routing-engine routing-engine-id**—Create a snapshot on the specified Routing Engine.

**root-partition**—(M, MX, T, TX Series routers only) Create a snapshot of the root partition only and store it onto the default **/altroot** on the hard disk device or an **/altroot** on a USB device.

Option deprecated for Junos OS with Upgraded FreeBSD in Junos OS Release 15.1.



**NOTE:** To determine which platforms run Junos OS with Upgraded FreeBSD, see the table listing the platforms currently running Junos OS with upgraded FreeBSD in *Understanding Junos OS with Upgraded FreeBSD*.

**slice alternate**—(EX Series switches only) (Optional) Take a snapshot of the active root partition and copy it to the alternate slice on the boot media.

Option deprecated for Junos OS with Upgraded FreeBSD in Junos OS Release 15.1.



**NOTE:** To determine which platforms run Junos OS with Upgraded FreeBSD, see the table listing the platforms currently running Junos OS with upgraded FreeBSD in *Understanding Junos OS with Upgraded FreeBSD*.

**scc**—(TX Matrix router only) (Optional) Archive data and executable areas for a TX Matrix router (or switch-card chassis).

**sfc number**—(TX Matrix Plus router only) (Optional) Archive data and executable areas for a TX Matrix Plus router (or switch-fabric chassis). Replace *number* with 0.

#### Additional Information

- (Routers only) Before upgrading the software on the router, when you have a known stable system, issue the **request system snapshot** command to back up the software, including the configuration, to the **/altroot** and **/altconfig** file systems. After you have upgraded the software on the router and are satisfied that the new packages are successfully installed and running, issue the **request system snapshot** command again to back up the new software to the **/altroot** and **/altconfig** file systems.
- (Routers only) You cannot issue the **request system snapshot** command when you enable flash disk mirroring. We recommend that you disable flash disk mirroring when you upgrade or downgrade the software. For more information, see the *Junos OS Administration Library for Routing Devices*.
- (TX Matrix and TX Matrix Plus router only) On a routing matrix, if you issue the **request system snapshot** command on the master Routing Engine, all the master Routing Engines connected to the routing matrix are backed up. If you issue this command on the backup Routing Engine, all the backup Routing Engines connected to the routing matrix are backed up.

**Required Privilege Level** maintenance

#### Related Documentation

- [request system snapshot \(Junos OS with Upgraded FreeBSD\) on page 123](#)
- [show system snapshot on page 168](#)
- [show system auto-snapshot on page 151](#)

#### List of Sample Output

[request system snapshot \(Routers\) on page 121](#)  
[request system snapshot \(EX Series Switches\) on page 121](#)  
[request system snapshot \(When the Partition Flag Is On\) on page 121](#)  
[request system snapshot \(MX104 routers when media device is missing\) on page 121](#)  
[request system snapshot \(When Mirroring Is Enabled\) on page 121](#)  
[request system snapshot all-lcc \(Routing Matrix\) on page 121](#)



[request system snapshot all-members \(Virtual Chassis\) on page 122](#)

**Output Fields** When you enter this command, you are provided feedback on the status of your request.

## Sample Output

### request system snapshot (Routers)

```
user@host> request system snapshot
umount: /altroot: not currently mounted
Copying / to /altroot.. (this may take a few minutes)
umount: /altconfig: not currently mounted
Copying /config to /altconfig.. (this may take a few minutes)
```

The following filesystems were archived: / /config

### request system snapshot (EX Series Switches)

```
user@switch> request system snapshot partition
Clearing current label...
Partitioning external media (/dev/da1) ...
Partitions on snapshot:

    Partition Mountpoint Size Snapshot argument
    s1a      /altroot    179M none
    s2a      /           180M none
    s3d      /var/tmp     361M none
    s3e      /var        121M none
    s4d      /config      60M  none
Copying '/dev/da0s1a' to '/dev/da1s1a' .. (this may take a few minutes)
Copying '/dev/da0s2a' to '/dev/da1s2a' .. (this may take a few minutes)
Copying '/dev/da0s3d' to '/dev/da1s3d' .. (this may take a few minutes)
Copying '/dev/da0s3e' to '/dev/da1s3e' .. (this may take a few minutes)
Copying '/dev/da0s4d' to '/dev/da1s4d' .. (this may take a few minutes)
The following filesystems were archived: /altroot / /var/tmp /var /config
```

### request system snapshot (When the Partition Flag Is On)

```
user@host> request system snapshot partition
Performing preliminary partition checks ...
Partitioning ad0 ...
umount: /altroot: not currently mounted
Copying / to /altroot.. (this may take a few minutes)
```

The following filesystems were archived: / /config

### request system snapshot (MX104 routers when media device is missing)

```
user@host > request system snapshot media usb0
error: usb0 media missing or invalid
```

### request system snapshot (When Mirroring Is Enabled)

```
user@host> request system snapshot
Snapshot is not possible since mirror-flash-on-disk is configured.
```

### request system snapshot all-lcc (Routing Matrix)

```
user@host> request system snapshot all-lcc
lcc0-re0:
```

-----

```
Copying '/' to '/altroot' .. (this may take a few minutes)
Copying '/config' to '/altconfig' .. (this may take a few minutes)
The following filesystems were archived: / /config
```

lcc2-re0:

```
-----
Copying '/' to '/altroot' .. (this may take a few minutes)
Copying '/config' to '/altconfig' .. (this may take a few minutes)
The following filesystems were archived: / /config
```

#### request system snapshot all-members (Virtual Chassis)

```
user@switch> request system snapshot all-members media internal
fpc0:
```

```
-----
Copying '/dev/da0s2a' to '/dev/da0s1a' .. (this may take a few minutes)
The following filesystems were archived: /
```

fpc1:

```
-----
Copying '/dev/da0s2a' to '/dev/da0s1a' .. (this may take a few minutes)
The following filesystems were archived: /
```

fpc2:

```
-----
Copying '/dev/da0s2a' to '/dev/da0s1a' .. (this may take a few minutes)
The following filesystems were archived: /
```

fpc3:

```
-----
Copying '/dev/da0s2a' to '/dev/da0s1a' .. (this may take a few minutes)
The following filesystems were archived: /
```


fpc4:

```
-----
Copying '/dev/da0s2a' to '/dev/da0s1a' .. (this may take a few minutes)
The following filesystems were archived: /
```

fpc5:

```
-----
Copying '/dev/da0s2a' to '/dev/da0s1a' .. (this may take a few minutes)
The following filesystems were archived: /
```

## request system snapshot (Junos OS with Upgraded FreeBSD)

<b>Syntax</b>	request system snapshot <delete <i>snapshot-name</i> > <load <i>snapshot-name</i> > <media <i>type</i> > <recovery>
<b>Release Information</b>	Command introduced in Junos OS Release 15.1 for MX240, MX480, MX960, MX2010, and MX2020 routers and EX9200 switches. Command introduced in Junos OS Release 15.1X53-D30 for QFX5200 switches.
<b>Description</b>	On the router or switch, back up the currently running and active file system partitions to standby partitions that are not running. Non-recovery snapshots are named <b>snap.date.time</b> and stored in the <b>/packages/sets</b> directory.
<div>  <p><b>CAUTION:</b> After you run the <b>request system snapshot</b> command, you cannot return to the previous version of the software, because the running and backup copies of the software are identical.</p> </div>	
<b>Options</b>	<p><b>none</b>—On the router or switch, back up the currently running and active file system partitions to standby partitions that are not running. Specifically, this creates a non-recovery snapshot named <b>snap.&lt;date&gt;.&lt;time&gt;</b> which is stored in <b>/packages/sets</b>.</p> <p><b>delete <i>snapshot-name</i></b>—(Optional) Delete a specific non-recovery snapshot from <b>/packages/sets</b>. Wildcards are supported, so <b>request system snapshot delete snap*</b> deletes all snapshots.</p> <p><b>load <i>snapshot-name</i></b>—(Optional) Load a specific snapshot from <b>/packages/sets</b>.</p> <p><b>media <i>type</i></b>—(Optional) Specify the boot device the software is copied to:</p> <ul style="list-style-type: none"> <li><b>usb</b>—(MX960 routers only) Copy software to the device connected to the USB port.</li> </ul> <p><b>recovery</b>—Create a recovery snapshot and store it in the <b>/oam</b> volume.</p>
<b>Additional Information</b>	Before upgrading the software on the router or switch, when you have a known stable system, issue the <b>request system snapshot</b> command to back up the software, including the configuration, to the <b>/packages/sets</b> file systems. After you have upgraded the software on the router or switch and are satisfied that the new packages are successfully installed and running, issue the <b>request system snapshot</b> command again to back up the new software to the <b>/packages/sets</b> file systems.
<b>Required Privilege Level</b>	maintenance

Related Documentation	<ul style="list-style-type: none"><li>• <a href="#">request system reboot (Junos OS with Upgraded FreeBSD) on page 125</a></li><li>• <a href="#">show system snapshot (Junos OS with Upgraded FreeBSD) on page 173</a></li><li>• <i>Understanding Junos OS with Upgraded FreeBSD</i></li></ul>
List of Sample Output	<a href="#">request system snapshot recovery on page 124</a> <a href="#">request system snapshot delete on page 124</a> <a href="#">request system snapshot on page 124</a>
Output Fields	When you enter this command, you are provided feedback on the status of your request.

## Sample Output

### [request system snapshot recovery](#)

```
user@host> request system snapshot recovery
Creating image ...
Compressing image . . .
Image size is 777MB

Recovery snapshot created successfully
```

### [request system snapshot delete](#)

```
user@host> request system snapshot delete snap.20150112.122106
NOTICE: Snapshot 'snap.20150112.122106' deleted successfully
```

### [request system snapshot](#)

```
user@host> request system snapshot
NOTICE: Snapshot snap.20150119.122106 created successfully
```

## request system reboot (Junos OS with Upgraded FreeBSD)

<b>Syntax</b>	<pre>request system reboot &lt;all-members&gt; &lt;at <i>time</i>&gt; &lt;both-routing-engines&gt; &lt;in <i>minutes</i>&gt; &lt;local&gt; &lt;media (oam   junos   network   usb)&gt; &lt;member <i>member-id</i>&gt; &lt;message "<i>text</i>"&gt; &lt;other-routing-engine&gt;</pre>
<b>Release Information</b>	<p>Command introduced in Junos OS Release 15.1 for MX240, MX480, MX960, MX2010, and MX2020 routers and EX9200 switches.</p> <p>Command introduced in Junos OS Release 15.1X53-D30 for QFX5200 switches.</p>
<b>Description</b>	Reboot the software.
<b>Options</b>	<p><b>none</b>—Reboot the software immediately.</p> <p><b>all-members</b>—(Optional) Reboot the software on all members of the Virtual Chassis configuration.</p> <p><b>at <i>time</i></b>—(Optional) Time at which to reboot the software, specified in one of the following ways:</p> <ul style="list-style-type: none"> <li><b>now</b>—Stop or reboot the software immediately. This is the default.</li> <li><b>+<i>minutes</i></b>—Number of minutes from now to reboot the software.</li> <li><b><i>yymmddhhmm</i></b>—Absolute time at which to reboot the software, specified as year, month, day, hour, and minute. Omitting a value will default to the current date for that value.</li> <li><b><i>hh:mm</i></b>—Absolute time on the current day at which to stop the software, specified in 24-hour time.</li> </ul> <p><b>both-routing-engines</b>—(Optional) Reboot both Routing Engines at the same time.</p> <p><b>in <i>minutes</i></b>—(Optional) Number of minutes from now to reboot the software. This option is an alias for the <b>at +<i>minutes</i></b> option.</p> <p><b>local</b>—(Optional) Reboot the software on the local Virtual Chassis member.</p> <p><b>media (oam   junos   network   usb)</b>—(Optional) Reboot the boot media:</p> <ul style="list-style-type: none"> <li><b>oam</b>—Reboot from the <b>oam</b> volume.</li> <li><b>junos</b>—Reboot from the <b>junos</b> volume.</li> <li><b>network</b>—Reboot from the network.</li> <li><b>usb</b>—Reboot from the USB device.</li> </ul>

**member *member-id***—(Optional) Reboot the software on the specified member of the Virtual Chassis configuration. Replace *member-id* with a value of 0 or 1.

**message "*text*"**—(Optional) Message to display to all system users before stopping or rebooting the software.

**other-routing-engine**—(Optional) Reboot the other Routing Engine from which the command is issued. For example, if you issue the command from the master Routing Engine, the backup Routing Engine is rebooted. Similarly, if you issue the command from the backup Routing Engine, the master Routing Engine is rebooted.

**Additional Information** Reboot requests are recorded in the system log files, which you can view with the **show log** command (see *show log*). Also, the names of any running processes that are scheduled to be shut down are changed. You can view the process names with the **show system processes** command (see *show system processes*).



**NOTE:** To reboot a router or switch that has two Routing Engines, reboot the backup Routing Engine (if you have upgraded it) first, and then reboot the master Routing Engine.

---

**Required Privilege Level** maintenance

**Related Documentation**

- [request system snapshot \(Junos OS with Upgraded FreeBSD\) on page 123](#)
- [show system snapshot \(Junos OS with Upgraded FreeBSD\) on page 173](#)
- *clear system reboot*
- *request system halt*
- *Understanding Junos OS with Upgraded FreeBSD*

**List of Sample Output**

[request system reboot on page 126](#)  
[request system reboot \(at 2300\) on page 126](#)  
[request system reboot \(in 2 Hours\) on page 127](#)  
[request system reboot \(Immediately\) on page 127](#)  
[request system reboot \(at 1:20 AM\) on page 127](#)

**Output Fields** When you enter this command, you are provided feedback on the status of your request.

## Sample Output

### [request system reboot](#)

```
user@host> request system reboot
Reboot the system ? [yes,no] (no)
```

### [request system reboot \(at 2300\)](#)

```
user@host> request system reboot at 2300 message "Maintenance time!"
```

```
Reboot the system ? [yes,no] (no) yes
```

```
shutdown: [pid 186]
```

```
*** System shutdown message from root@berry.network.net ***
```

```
System going down at 23:00
```

#### request system reboot (in 2 Hours)

The following example, which assumes that the time is 5 PM (17:00), illustrates three different ways to request the system to reboot in two hours:

```
user@host> request system reboot at +120
```

```
user@host> request system reboot in 120
```

```
user@host> request system reboot at 19:00
```

#### request system reboot (Immediately)

```
user@host> request system reboot at now
```

#### request system reboot (at 1:20 AM)

To reboot the system at 1:20 AM, enter the following command. Because 1:20 AM is the next day, you must specify the absolute time.

```
user@host> request system reboot at 06060120
```

```
request system reboot at 120
```

```
Reboot the system at 120? [yes,no] (no) yes
```

## request system software add

---

**List of Syntax**    [Syntax on page 128](#)  
                          [Syntax \(EX Series Switches\) on page 128](#)  
                          [Syntax \(TX Matrix Router\) on page 128](#)  
                          [Syntax \(TX Matrix Plus Router\) on page 129](#)  
                          [Syntax \(MX Series Router\) on page 129](#)  
                          [Syntax \(QFX Series\) on page 129](#)  
                          [Syntax \(OCX Series\) on page 129](#)

**Syntax**    request system software add *package-name*  
                  <best-effort-load>  
                  <delay-restart>  
                  <device-alias *alias-name*>  
                  <force>  
                  <no-copy>  
                  <no-validate>  
                  <re0 | re1>  
                  <reboot>  
                  <satellite *slot-id*>  
                  <set [*package-name package-name*]>  
                  <unlink>  
                  <upgrade-group [all | *upgrade-group-name*]>  
                  <upgrade-with-config>  
                  <upgrade-with-config-format *format*>  
                  <satellite *slot-id*>  
                  <validate>  
                  <version *version-string*>

**Syntax (EX Series Switches)**    request system software add *package-name*  
                  <best-effort-load>  
                  <delay-restart>  
                  <force>  
                  <no-copy>  
                  <no-validate>  
                  <re0 | re1>  
                  <reboot>  
                  <set [*package-name package-name*]>  
                  <upgrade-with-config>  
                  <upgrade-with-config-format *format*>  
                  <validate>

**Syntax (TX Matrix Router)**    request system software add *package-name*  
                  <best-effort-load>  
                  <delay-restart>  
                  <force>  
                  <lcc *number* | scc>  
                  <no-copy>  
                  <no-validate>  
                  <re0 | re1>  
                  <reboot>  
                  <set [*package-name package-name*]>  
                  <unlink>



	<pre> &lt;upgrade-with-config&gt; &lt;upgrade-with-config-format <i>format</i>&gt; &lt;validate&gt; </pre>
Syntax (TX Matrix Plus Router)	<pre> request system software add <i>package-name</i> &lt;best-effort-load&gt; &lt;delay-restart&gt; &lt;force&gt; &lt;lcc <i>number</i>   sfc <i>number</i>&gt; &lt;no-copy&gt; &lt;no-validate&gt; &lt;re0   re1&gt; &lt;reboot&gt; &lt;set [<i>package-name package-name</i>]&gt; &lt;unlink&gt; &lt;upgrade-with-config&gt; &lt;upgrade-with-config-format <i>format</i>&gt; &lt;validate&gt; </pre>
Syntax (MX Series Router)	<pre> request system software add <i>package-name</i> &lt;best-effort-load&gt; &lt;delay-restart&gt; &lt;device-alias <i>alias-name</i>&gt; &lt;force&gt; &lt;member <i>member-id</i>&gt; &lt;no-copy&gt; &lt;no-validate&gt; &lt;re0   re1&gt; &lt;reboot&gt; &lt;satellite <i>slot-id</i>&gt; &lt;set [<i>package-name package-name</i>]&gt; &lt;upgrade-group [all   <i>upgrade-group-name</i>]&gt; &lt;unlink&gt; &lt;upgrade-with-config&gt; &lt;upgrade-with-config-format <i>format</i>&gt; &lt;validate&gt; &lt;version <i>version-string</i>&gt; </pre>
Syntax (QFX Series)	<pre> request system software add <i>package-name</i> &lt;best-effort-load&gt; &lt;component all&gt; &lt;delay-restart&gt; &lt;force&gt; &lt;force-host&gt; &lt;no-copy&gt; &lt;no-validate&gt; &lt;partition&gt; &lt;reboot&gt; &lt;unlink&gt; &lt;upgrade-with-config&gt; &lt;upgrade-with-config-format <i>format</i>&gt; &lt;validate&gt; </pre>
Syntax (OCX Series)	<pre> request system software add <i>package-name</i> </pre>

```

<best-effort-load>
<delay-restart>
<force>
<force-host>
<no-copy>
<no-validate>
<reboot>
<unlink>
<upgrade-with-config>
<upgrade-with-config-format format>
<validate>

```

**Release Information**

Command introduced before Junos OS Release 7.4.

**best-effort-load** and **unlink** options added in Junos OS Release 7.4.

Command introduced in Junos OS Release 9.0 for EX Series switches.

**sfc** option introduced for the TX Matrix Plus router in Junos OS Release 9.6.

Command introduced in Junos OS Release 11.1 for the QFX Series.

**set [package-name package-name]** option added in Junos OS Release 11.1 for EX Series switches.

**set [package-name package-name]** option added in Junos OS Release 12.2 for M Series, MX Series, T Series routers, and Branch SRX Series Services Gateways.



**NOTE:** On EX Series switches, the **set [package-name package-name]** option allows you to install only two software packages on a mixed EX4200 and EX4500 Virtual Chassis, whereas, on M Series, MX Series, T Series routers, and Branch SRX Series Services Gateways, the **set [package-name package-name]** option allows you to install multiple software packages and software add-on packages at the same time.

**upgrade-with-config** and **upgrade-with-config-format *format*** options added in Junos OS Release 12.3 for M Series routers, MX Series routers, T Series routers, EX Series Ethernet switches, and QFX Series devices.

Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.

**device-alias**, **satellite**, **upgrade-group**, and **version** options introduced in Junos OS Release 14.2R3 for Junos Fusion.

**Description**

**NOTE:** We recommend that you always download the software image to **/var/tmp** only. On EX Series and QFX Series switches, you must use the **/var/tmp** directory. Other directories are not supported.

Install a software package or bundle on the router or switch.



**WARNING:** Any configuration changes performed after inputting the **request system software add** command will be lost when the system reboots with an upgraded version of Junos OS.



**NOTE:** When graceful Routing Engine switchover (GRES) is enabled on a device, you must perform a unified ISSU operation to update the software running on the device. With GRES enabled, if you attempt to perform a software upgrade by entering the request system software add *package-name* command, an error message is displayed stating that only in-service-software-upgrades are supported when GRES is configured. In such a case, you must either remove the GRES configuration before you attempt the upgrade or perform a unified ISSU.

**Options** *package-name*—Location from which the software package or bundle is to be installed.  
For example:

- */var/tmp/package-name*—For a software package or bundle that is being installed from a local directory on the router or switch.
- *protocol://hostname/pathname/package-name*—For a software package or bundle that is to be downloaded and installed from a remote location. Replace *protocol* with one of the following:
  - **ftp**—File Transfer Protocol.  
Use *ftp://hostname/pathname/package-name*. To specify authentication credentials, use *ftp://<username>:<password>@hostname/pathname/package-name*. To have the system prompt you for the password, specify **prompt** in place of the password. If a password is required, and you do not specify the password or **prompt**, an error message is displayed.
  - **http**—Hypertext Transfer Protocol.  
Use *http://hostname/pathname/package-name*. To specify authentication credentials, use *http://<username>:<password>@hostname/pathname/package-name*. If a password is required and you omit it, you are prompted for it.
  - **scp**—Secure copy (available only for Canada and U.S. version).  
Use *scp://hostname/pathname/package-name*. To specify authentication credentials, use *scp://<username>:<password>@hostname/pathname/package-name*.



---

**NOTE:**

- The *pathname* in the protocol is the relative path to the user's home directory on the remote system and not the root directory.
  - Do not use the `scp` protocol in the `request system software add` command to download and install a software package or bundle from a remote location. The previous statement does not apply to the QFabric switch. The software upgrade is handled by the MGD process which does not support `scp`.  
Use the `file copy` command to copy the software package or bundle from the remote location to the `/var/tmp` directory on the hard disk:  
`file copy scp://source/package-name /var/tmp`  
Then install the software package or bundle using the `request system software add` command:  
`request system software add /var/tmp/package-name`
- 

**best-effort-load**—(Optional) Activate a partial load and treat parsing errors as warnings instead of errors.

**component all**—(QFabric systems only) (Optional) Install software package on all of the QFabric components.

**delay-restart**—(Optional) Install a software package or bundle, but do not restart software processes.

**device-alias *alias-name***—(Junos Fusion only) (Optional) Install the satellite software package onto the specified satellite device using the satellite device's alias name.

**force**—(Optional) Force the addition of the software package or bundle (ignore warnings).

**force-host**—(Optional) Force the addition of host software package or bundle (ignore warnings) on the QFX5100 device.

**lcc *number***—(TX Matrix routers and TX Matrix Plus routers only) (Optional) In a routing matrix based on the TX Matrix router, install a software package or bundle on a T640 router that is connected to the TX Matrix router. In a routing matrix based on the TX Matrix Plus router, install a software package or bundle on a router that is connected to the TX Matrix Plus router.

Replace *number* with the following values depending on the LCC configuration:

- 0 through 3, when T640 routers are connected to a TX Matrix router in a routing matrix.
- 0 through 3, when T1600 routers are connected to a TX Matrix Plus router in a routing matrix.

- 0 through 7, when T1600 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.
- 0, 2, 4, or 6, when T4000 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.

**member *member-id***—(MX Series routers only) (Optional) Install a software package on the specified Virtual Chassis member. Replace *member-id* with a value of 0 or 1.

**partition**—(QFX3500 switches only) (Optional) Format and repartition the media before installation.

**satellite *slot-id***—(Junos Fusion only) (Optional) Install the satellite software package onto the specified satellite device using the satellite devices FPC slot identifier.

**scc**—(TX Matrix routers only) (Optional) Install a software package or bundle on a Routing Engine on a TX Matrix router (or switch-card chassis).

**sfc *number***—(TX Matrix Plus routers only) (Optional) Install a software package or bundle on a Routing Engine on a TX Matrix Plus router. Replace *number* with 0.

**no-copy**—(Optional) Install a software package or bundle, but do not save copies of the package or bundle files.

**no-validate**—(Optional) When loading a software package or bundle with a different release, suppress the default behavior of the **validate** option.

**re0 | re1**—(Optional) On routers or switches that support dual or redundant Routing Engines, load a software package or bundle on the Routing Engine in slot 0 (re0) or the Routing Engine in slot 1 (re1).

**reboot**—(Optional) After adding the software package or bundle, reboot the system. On a QFabric switch, the software installation is not complete until you reboot the component for which you have installed the software.

**set [*package-name package-name*]**—(Mixed EX4200 and EX4500 Virtual Chassis only) (Optional) Install two software packages—a package for an EX4200 switch and the same release of the package for an EX4500 switch—to upgrade all member switches in a mixed EX4200 and EX4500 Virtual Chassis.

**set [*package-name package-name*]**—(M Series, MX Series, T Series routers, and Branch SRX Series Services Gateways only) (Optional) Install multiple software packages and software add-on packages at the same time.

**unlink**—(Optional) On M Series, T Series, and MX Series routers, use the unlink option to remove the software package from this directory after a successful upgrade is completed.

**upgrade-group [ all | *upgrade-group-name* ]**—(Junos Fusion only) (Required to configure a Junos Fusion using autoconversion or manual conversion) Associate a satellite software image with a satellite software upgrade group. The satellite software package is associated with the specified satellite software upgrade group using the

*upgrade-group-name*, or for all satellite software upgrade groups in a Junos Fusion when the *all* keyword is specified.

A satellite software upgrade group is a group of satellite devices in a Junos Fusion that are designated to upgrade to the same satellite software version using the same satellite software package. See *Understanding Software in a Junos Fusion* and *Managing Satellite Software Upgrade Groups in a Junos Fusion*.

**upgrade-with-config**—(Optional) Install one or more configuration files.

**upgrade-with-config-format *format***—(Optional) Specify the configuration file format, **text** or **xml**. The default format is **text**.



**NOTE:** The **upgrade-with-config** and **upgrade-with-config-format** options are only available locally on the router or switch. In a routing matrix, the configuration is applied only to the local router and is not propagated to other routers.

The options are validated during the validation process and applied to the router or switch during the upgrade process. If the upgrade process is successful, the options are removed from the configuration. If the upgrade process fails, the configuration file is renamed with the **.failed** suffix.

---

**validate**—(Optional) Validate the software package or bundle against the current configuration as a prerequisite to adding the software package or bundle. This is the default behavior when the software package or bundle being added is a different release.



**NOTE:** The **validate** option only works on systems that do not have graceful-switchover (GRES) enabled. To use the **validate** option on a system with GRES, either disable GRES for the duration of the installation, or install using the command **request system software in-service-upgrade**, which requires nonstop active routing (NSR) to be enabled when using GRES.

---

**version *version-string***—(Junos Fusion only) (Optional) Associate a satellite software package with a satellite software upgrade group by selecting the satellite software package's version. This option can only be used if the specified version of the satellite software has previously been installed on the aggregation device.

**Additional Information** Before upgrading the software on the router or switch, when you have a known stable system, issue the **request system snapshot** command to back up the software, including the configuration, to the **/altroot** and **/altconfig** file systems. After you have upgraded the software on the router or switch and are satisfied that the new package or bundle is

successfully installed and running, issue the **request system snapshot** command again to back up the new software to the **/altroot** and **/altconfig** file systems.



**NOTE:** The **request system snapshot** command is currently not supported on the QFabric system. Also, you cannot add or install multiple packages on a QFabric system.

After you run the **request system snapshot** command, you cannot return to the previous version of the software, because the running and backup copies of the software are identical.

If you are upgrading more than one package at the same time, delete the operating system package, **jkernl**, last. Add the operating system package, **jkernl**, first and the routing software package, **jroute**, last. If you are upgrading all packages at once, delete and add them in the following order:

```
user@host> request system software add /var/tmp/jbase
user@host> request system software add /var/tmp/jkernl
user@host> request system software add /var/tmp/jpfe
user@host> request system software add /var/tmp/jdocs
user@host> request system software add /var/tmp/jroute
user@host> request system software add /var/tmp/jcrypto
```

By default, when you issue the **request system software add package-name** command on a TX Matrix master Routing Engine, all the T640 master Routing Engines that are connected to it are upgraded to the same version of software. If you issue the same command on the TX Matrix backup Routing Engine, all the T640 backup Routing Engines that are connected to it are upgraded to the same version of software.

Likewise, when you issue the **request system software add package-name** command on a TX Matrix Plus master Routing Engine, all the T1600 or T4000 master Routing Engines that are connected to it are upgraded to the same version of software. If you issue the same command on the TX Matrix Plus backup Routing Engine, all the T1600 or T4000 backup Routing Engines that are connected to it are upgraded to the same version of software.

**Required Privilege Level** maintenance

- Related Documentation**
- [request system software delete on page 138](#)
  - [request system software rollback on page 142](#)
  - *request system storage cleanup*
  - *Upgrading Software*
  - *Upgrading Software on a QFabric System*
  - *Managing Satellite Software Upgrade Groups in a Junos Fusion*
  - *request system software add (Maintenance)*

- [Routing Matrix with a TX Matrix Plus Router Solutions Page](#)

List of Sample Output	<a href="#">request system software add validate on page 136</a>
	<a href="#">request system software add (Mixed EX4200 and EX4500 Virtual Chassis) on page 137</a>
	<a href="#">request system software add component all (QFabric Systems) on page 137</a>
	<a href="#">request system software add upgrade-group (Junos Fusion) on page 137</a>
Output Fields	When you enter this command, you are provided feedback on the status of your request.

## Sample Output

### [request system software add validate](#)

```
user@host> request system software add validate /var/tmp/jinstall-7.2R1.7-domestic-signed.tgz
Checking compatibility with configuration
Initializing...
Using jbase-7.1R2.2
Using /var/tmp/jinstall-7.2R1.7-domestic-signed.tgz
Verified jinstall-7.2R1.7-domestic.tgz signed by PackageProduction_7_2_0
Using /var/validate/tmp/jinstall-signed/jinstall-7.2R1.7-domestic.tgz
Using /var/validate/tmp/jinstall/jbundle-7.2R1.7-domestic.tgz
Checking jbundle requirements on /
Using /var/validate/tmp/jbundle/jbase-7.2R1.7.tgz
Using /var/validate/tmp/jbundle/jkernel-7.2R1.7.tgz
Using /var/validate/tmp/jbundle/jcrypto-7.2R1.7.tgz
Using /var/validate/tmp/jbundle/jpfe-7.2R1.7.tgz
Using /var/validate/tmp/jbundle/jdocs-7.2R1.7.tgz
Using /var/validate/tmp/jbundle/jroute-7.2R1.7.tgz
Validating against /config/juniper.conf.gz
mgd: commit complete
Validation succeeded
Validating against /config/rescue.conf.gz
mgd: commit complete
Validation succeeded
Installing package '/var/tmp/jinstall-7.2R1.7-domestic-signed.tgz' ...
Verified jinstall-7.2R1.7-domestic.tgz signed by PackageProduction_7_2_0
Adding jinstall...

WARNING: This package will load JUNOS 7.2R1.7 software.
WARNING: It will save JUNOS configuration files, and SSH keys
WARNING: (if configured), but erase all other files and information
WARNING: stored on this machine. It will attempt to preserve dumps
WARNING: and log files, but this can not be guaranteed. This is the
WARNING: pre-installation stage and all the software is loaded when
WARNING: you reboot the system.

Saving the config files ...
Installing the bootstrap installer ...

WARNING: A REBOOT IS REQUIRED TO LOAD THIS SOFTWARE CORRECTLY. Use the
WARNING: 'request system reboot' command when software installation is
WARNING: complete. To abort the installation, do not reboot your system,
WARNING: instead use the 'request system software delete jinstall'
WARNING: command as soon as this operation completes.

Saving package file in /var/sw/pkg/jinstall-7.2R1.7-domestic-signed.tgz ...
Saving state for rollback ...
```



## Sample Output

### request system software add (Mixed EX4200 and EX4500 Virtual Chassis)

```
user@switch> request system software add set
[/var/tmp/jinstall-ex-4200-11.1R1.1-domestic-signed.tgz
/var/tmp/jinstall-ex-4500-11.1R1.1-domestic-signed.tgz]
...
```

### request system software add component all (QFabric Systems)

```
user@switch> request system software add /pbdata/packages/jinstall-qfabric-12.2X50-D1.3.rpm
component all
...
```

### request system software add upgrade-group (Junos Fusion)

```
user@aggregation-device> request system software add /var/tmp/satellite-1.0R1.1-signed.tgz
upgrade-group group1
```

## request system software delete

<b>List of Syntax</b>	<a href="#">Syntax on page 138</a> <a href="#">Syntax (TX Matrix Router) on page 138</a> <a href="#">Syntax (TX Matrix Plus Router) on page 138</a>
<b>Syntax</b>	<pre>request system software delete <i>software-package</i> &lt;force&gt; &lt;reboot&gt; &lt;set [<i>package-name package-name</i>]&gt; &lt;upgrade-group [<i>all   upgrade-group-name</i>]&gt; &lt;version <i>version-string</i>&gt;</pre>
<b>Syntax (TX Matrix Router)</b>	<pre>request system software delete <i>software-package</i> &lt;force&gt; &lt;lcc <i>number</i>   scc&gt; &lt;reboot&gt; &lt;set [<i>package-name package-name</i>]&gt;</pre>
<b>Syntax (TX Matrix Plus Router)</b>	<pre>request system software delete <i>software-package</i> &lt;force&gt; &lt;lcc <i>number</i>   sfc <i>number</i>&gt; &lt;reboot&gt; &lt;set [<i>package-name package-name</i>]&gt;</pre>
<b>Release Information</b>	<p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Option <b>sfc</b> introduced for the TX Matrix Plus router in Junos OS Release 9.6.</p> <p>Command introduced in Junos OS Release 11.1 for the QFX Series.</p> <p>Option <b>set</b> [<i>package-name package-name</i>] added in Junos OS Release 12.2 for M Series, MX Series, T Series routers, and Branch SRX Services Gateways.</p> <p>Option <b>reboot</b> introduced in Junos OS Release 12.3.</p> <p>Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p> <p>Options <b>upgrade-group</b>, and <b>version</b> introduced in Junos OS Release 14.2R3 for Junos Fusion.</p>
<b>Description</b>	Remove a software package or bundle from the router or switch.



**CAUTION:** Before removing a software package or bundle, make sure that you have already placed the new software package or bundle that you intend to load onto the router or switch.

- Options** *software-package*—Software package or bundle name. You can delete any or all of the following software bundles or packages:
- **jbase**—(Optional) Junos base software suite
  - **crypto**—(Optional, in domestic version only) Junos security software
  - **jdocs**—(Optional) Junos online documentation file

- **jkernel**—(Optional) Junos kernel software suite
- **jpfe**—(Optional) Junos Packet Forwarding Engine support
- **jroute**—(Optional) Junos routing software suite
- **junos**—(Optional) Junos base software



**NOTE:** On EX Series switches, some of the package names are different than those listed. To see the list of packages that you can delete on an EX Series switch, enter the command **show system software**.

**force**—(Optional) Ignore warnings and force removal of the software.

**lcc number**—(TX Matrix routers and TX Matrix Plus routers only) (Optional) In a routing matrix, delete a software package or bundle on a T640 router indicated by **lcc number** that is connected to the TX Matrix router. In a routing matrix, delete a software package or bundle on a router indicated by **lcc number** that is connected to the TX Matrix Plus router.

Replace *number* with the following values depending on the LCC configuration:

- 0 through 3, when T640 routers are connected to a TX Matrix router in a routing matrix.
- 0 through 3, when T1600 routers are connected to a TX Matrix Plus router in a routing matrix.
- 0 through 7, when T1600 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.
- 0, 2, 4, or 6, when T4000 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.

**re0 | re1**—(Optional) On routers or switches that support dual or redundant Routing Engines, delete a software package or bundle on the Routing Engine in slot 0 (re0) or the Routing Engine in slot 1 (re1).

**reboot**—As of Junos OS 12.3 and greater, automatically reboot upon completing the **request system software delete** command.

**scc**—(TX Matrix routers only) (Optional) Remove an extension or upgrade package from the TX Matrix router (or switch-card chassis).

**set [package-name package-name]**—(M Series, MX Series, T Series routers, and Branch SRX Series Services Gateways only) (Optional) Install multiple software packages or software add-on packages at the same time.

**sfc number**—(TX Matrix Plus routers only) (Optional) Remove an extension or upgrade package from the TX Matrix Plus router. Replace *number* with 0.

**upgrade-group** [ all [*upgrade-group-name*]—(Junos Fusion only) Delete the satellite software image association with the specified satellite software upgrade group.

A satellite software upgrade group is a group of satellite devices in the same Junos Fusion that are designated to upgrade to the same satellite software version using the same satellite software package.

**version** *version-string*—(Junos Fusion only) (Optional) Delete a satellite software package association with a satellite software upgrade group by selecting the satellite software package's version.

**Additional Information** Before upgrading the software on the router or switch, when you have a known stable system, issue the **request system snapshot** command to back up the software, including the configuration, to the /altroot and /altconfig file systems (on routers) or the /, /altroot, /config, /var, and /var/tmp file systems (on switches). After you have upgraded the software on the router or switch and are satisfied that the new packages are successfully installed and running, issue the **request system snapshot** command again to back up the new software to the /altroot and /altconfig file systems (on routers) or the /, /altroot, /config, /var, and /var/tmp file systems (on switches). After you run the **request system snapshot** command, you cannot return to the previous version of the software, because the running and backup copies of the software are identical.

**Required Privilege Level** maintenance

**Related Documentation**

- [request system software add on page 128](#)
- [request system software rollback on page 142](#)
- [request system software validate on page 147](#)
- [Routing Matrix with a TX Matrix Plus Router Solutions Page](#)

**List of Sample Output** [request system software delete jdocs on page 140](#)

**Output Fields** When you enter this command, you are provided feedback on the status of your request.

## Sample Output

### [request system software delete jdocs](#)

The following example displays the system software packages before and after the **jdocs** package is deleted through the **request system software delete** command:

```
user@host> show system software
Information for jbase:
```

```
Comment:
JUNOS Base OS Software Suite [7.2R1.7]
```

```
Information for jcrypto:
```

```
Comment:
JUNOS Crypto Software Suite [7.2R1.7]
```

Information for jdocs:

Comment:  
JUNOS Online Documentation [7.2R1.7]

Information for jkernel:

Comment:  
JUNOS Kernel Software Suite [7.2R1.7]

...

```
user@host> request system software delete jdocs
Removing package 'jdocs' ...
```

```
user@host> show system software
Information for jbase:
```

Comment:  
JUNOS Base OS Software Suite [7.2R1.7]

Information for jcrypto:

Comment:  
JUNOS Crypto Software Suite [7.2R1.7]

Information for jkernel:

Comment:  
JUNOS Kernel Software Suite [7.2R1.7]

...

## request system software rollback

---

<b>List of Syntax</b>	<a href="#">Syntax on page 142</a> <a href="#">Syntax (EX Series Switches) on page 142</a> <a href="#">Syntax (TX Matrix Router) on page 142</a> <a href="#">Syntax (TX Matrix Plus Router) on page 142</a> <a href="#">Syntax (MX Series Router) on page 142</a>
<b>Syntax</b>	request system software rollback
<b>Syntax (EX Series Switches)</b>	request system software rollback <all-members> <local> <member <i>member-id</i> > <reboot>
<b>Syntax (TX Matrix Router)</b>	request system software rollback <lcc <i>number</i>   scc> <reboot>
<b>Syntax (TX Matrix Plus Router)</b>	request system software rollback <lcc <i>number</i>   sfc <i>number</i> > <reboot>
<b>Syntax (MX Series Router)</b>	request system software rollback <all-members> <device-alias <i>alias-name</i> > <local> <member <i>member-id</i> > <reboot> <satellite <i>slot-id</i> > <upgrade-group [ <i>all</i>   <i>upgrade-group-name</i> ]>
<b>Release Information</b>	Command introduced before Junos OS Release 7.4. Command introduced in Junos OS Release 9.0 for EX Series switches. Option <b>sfc</b> introduced for the TX Matrix Plus router in Junos OS Release 9.6. Command introduced in Junos OS Release 11.1 for the QFX Series. Command behavior changed in Junos OS Release 12.1. Option <b>reboot</b> introduced in Junos OS Release 12.3. Options <b>device-alias</b> , <b>satellite</b> , and <b>upgrade-group</b> introduced in Junos OS Release 14.2R3 for Junos Fusion. Option <b>force</b> deprecated for Junos OS with Upgraded FreeBSD in Junos OS Release 15.1.



**NOTE:** To determine which platforms run Junos OS with Upgraded FreeBSD, see the table listing the platforms currently running Junos OS with upgraded FreeBSD in *Understanding Junos OS with Upgraded FreeBSD*.

---

**Description** For all versions of Junos OS up to and including Junos OS 11.4, revert to the software that was loaded at the last successful **request system software add** command.

As of Junos OS 12.1 and greater, revert to the last known good state before the most recent **request system software (add | delete)** command. For example, using **rollback** in Junos OS 12.1 after using **request system software add** restores the system to a known good state prior to using the **add** command. Similarly, using **rollback** in Junos OS 12.1 after using **request system software delete** restores the system to a known good state prior to using the **delete** command.

A software rollback fails if any required package (or a **bundle** package containing the required package) cannot be found in `/var/sw/pkg`.

#### *Additional Information*

- On a Junos Fusion, the **request system software rollback** command can be used to roll back the version of satellite software associated with a satellite software upgrade group. Rolling back the version of satellite software associated with a satellite software upgrade group triggers a satellite software upgrade.
- On M Series and T Series routers, if **request system software add <jinstall> reboot** was used for the previous installation, then **request system software rollback** has no effect. In this case, use **jinstall** to reinstall the required package.
- On M Series and T Series routers, if **request system software add <sdk1>** was used for the previous installation, then **request system software rollback** removes the last installed SDK package (**sdk1** in this example).
- On SRX Series devices with dual root systems, when **request system software rollback** is run, the system switches to the alternate root. Each root can have a different version of Junos OS. Roll back takes each root back to the previously installed image.
- On QFX3500 and QFX3600 devices in a mixed Virtual Chassis, when the **request system software rollback** command is issued, the system does not rollback to the image stored in the alternate partition.
- On QFX5100 switches, the **reboot** option has been removed. To reboot the switch after a software rollback, issue the **request system reboot** command as a separate, secondary command.

**Options** **all-members**—(EX4200 switches and MX Series routers only) (Optional) Attempt to roll back to the previous set of packages on all members of the Virtual Chassis configuration.

**device-alias *alias-name***—(Junos Fusion only) (Optional) Rollback the satellite software package onto the specified satellite device using the satellite devices FPC slot identifier.

**lcc *number***—(TX Matrix routers and TX Matrix Plus routers only) (Optional) On a TX Matrix router, attempt to roll back to the previous set of packages on a T640 router connected to the TX Matrix router. On a TX Matrix Plus router, attempt to roll back to the previous set of packages on a connected router connected to the TX Matrix Plus router.

Replace *number* with the following values depending on the LCC configuration:

- 0 through 3, when T640 routers are connected to a TX Matrix router in a routing matrix.
- 0 through 3, when T1600 routers are connected to a TX Matrix Plus router in a routing matrix.
- 0 through 7, when T1600 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.
- 0, 2, 4, or 6, when T4000 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.

**local**—(EX4200 switches and MX Series routers only) (Optional) Attempt to roll back to the previous set of packages on the local Virtual Chassis member.

**member *member-id***—(EX4200 switches and MX Series routers only) (Optional) Attempt to roll back to the previous set of packages on the specified member of the Virtual Chassis configuration. For EX4200 switches, replace *member-id* with a value from 0 through 9. For an MX Series Virtual Chassis, replace *member-id* with a value of 0 or 1.

**none**—For all versions of Junos OS up to and including Junos OS 11.4, revert to the set of software as of the last successful **request system software add**. As of Junos OS 12.1 and greater, revert to the last known good state before the most recent **request system software (add | delete)** command.

**reboot**—As of Junos OS 12.3 and greater, automatically reboot upon completing the **request system software rollback** command.

**satellite *slot-id***—(Junos Fusion only) (Optional) Roll back the satellite software package onto the specified satellite device using the satellite devices FPC slot identifier.

**scc**—(TX Matrix routers only) (Optional) Attempt to roll back to the previous set of packages on the TX Matrix router (or switch-card chassis).

**sfc *number***—(TX Matrix Plus routers only) (Optional) Attempt to roll back to the previous set of packages on the TX Matrix Plus router. Replace *number* with 0.

**upgrade-group [ all | *upgrade-group-name* ]**—(Junos Fusion only) Roll back the satellite software image associated with the specified satellite software upgrade group, or for all satellite software upgrade groups in the Junos Fusion when **all** is entered.

**Required Privilege Level**

maintenance

**Related Documentation**

- [request system software abort](#)
- [request system software add on page 128](#)
- [request system software delete on page 138](#)
- [request system software validate on page 147](#)



- *request system configuration rescue delete*
- *request system configuration rescue save*
- [Routing Matrix with a TX Matrix Plus Router Solutions Page](#)

**List of Sample Output**    [request system software rollback on page 146](#)

**Output Fields**    When you enter this command, you are provided feedback on the status of your request.

## Sample Output

### request system software rollback

```
user@host> request system software rollback
Verified SHA1 checksum of ./jbase-7.2R1.7.tgz
Verified SHA1 checksum of ./jdocs-7.2R1.7.tgz
Verified SHA1 checksum of ./jroute-7.2R1.7.tgz
Installing package './jbase-7.2R1.7.tgz' ...
Available space: 35495 require: 7335
Installing package './jdocs-7.2R1.7.tgz' ...
Available space: 35339 require: 3497
Installing package './jroute-7.2R1.7.tgz' ...
Available space: 35238 require: 6976
NOTICE: uncommitted changes have been saved in
/var/db/config/juniper.conf.pre-install
Reloading /config/juniper.conf.gz ...
Activating /config/juniper.conf.gz ...
mgd: commit complete
Restarting mgd ...
Restarting aprobed ...
Restarting apsd ...
Restarting cosd ...
Restarting fsad ...
Restarting fud ...
Restarting gcdrd ...
Restarting ilmid ...
Restarting irsd ...
Restarting l2tpd ...
Restarting mib2d ...
Restarting nasd ...
Restarting pppoed ...
Restarting rdd ...
Restarting rmopd ...
Restarting rtspd ...
Restarting sampled ...
Restarting serviced ...
Restarting snmpd ...
Restarting spd ...
Restarting vrrpd ...

WARNING: cli has been replaced by an updated version:
CLI release 7.2R1.7 built by builder on 2005-04-22 02:03:44 UTC
Restart cli using the new version ? [yes,no] (yes) yes

Restarting cli ...
user@host
```

## request system software validate

<b>List of Syntax</b>	<a href="#">Syntax on page 147</a> <a href="#">Syntax (TX Matrix Router) on page 147</a> <a href="#">Syntax (TX Matrix Plus Router) on page 147</a> <a href="#">Syntax (MX Series Router) on page 147</a>
<b>Syntax</b>	<pre>request system software validate <i>package-name</i> &lt;set [<i>package-name package-name</i>]&gt; &lt;upgrade-with-config&gt; &lt;upgrade-with-config-format <i>format</i>&gt;</pre>
<b>Syntax (TX Matrix Router)</b>	<pre>request system software validate <i>package-name</i> &lt;lcc <i>number</i>   scc&gt; &lt;set [<i>package-name package-name</i>]&gt; &lt;upgrade-with-config&gt; &lt;upgrade-with-config-format <i>format</i>&gt;</pre>
<b>Syntax (TX Matrix Plus Router)</b>	<pre>request system software validate <i>package-name</i> &lt;lcc <i>number</i>   sfc <i>number</i>&gt; &lt;set [<i>package-name package-name</i>]&gt; &lt;upgrade-with-config&gt; &lt;upgrade-with-config-format <i>format</i>&gt;</pre>
<b>Syntax (MX Series Router)</b>	<pre>request system software validate <i>package-name</i> &lt;member <i>member-id</i>&gt; &lt;set [<i>package-name package-name</i>]&gt; &lt;upgrade-with-config&gt; &lt;upgrade-with-config-format <i>format</i>&gt;</pre>
<b>Release Information</b>	<p>Command introduced before Junos OS Release 7.4.</p> <p><b>sfc</b> option introduced for the TX Matrix Plus router in Junos OS Release 9.6.</p> <p>Command introduced in Junos OS Release 11.1 for the QFX Series.</p> <p><b>set [<i>package-name package-name</i>]</b> option added in Junos OS Release 12.2 for M Series, MX Series, T Series routers, and Branch SRX Series Services Gateways.</p> <p><b>upgrade-with-config</b> and <b>upgrade-with-config-format <i>format</i></b> options added in Junos OS Release 12.3 for M Series routers, MX Series routers, and T Series routers.</p> <p>Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p>
<b>Description</b>	Validate candidate software against the current configuration of the router.
<b>Options</b>	<p><b>lcc <i>number</i></b>—(TX Matrix routers and TX Matrix Plus routers only) (Optional) On a TX Matrix router, validate the software bundle or package on a specific T640 router (or line-card chassis) that is connected to the TX Matrix router. On a TX Matrix Plus router, validate the software bundle or package for a specific router that is connected to the TX Matrix Plus router.</p>

Replace *number* with the following values depending on the LCC configuration:

- 0 through 3, when T640 routers are connected to a TX Matrix router in a routing matrix.
- 0 through 3, when T1600 routers are connected to a TX Matrix Plus router in a routing matrix.
- 0 through 7, when T1600 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.
- 0, 2, 4, or 6, when T4000 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.

**member *member-id***—(MX Series routers only) (Optional) Validate the software bundle or package on the specified member of the Virtual Chassis configuration. For an MX Series Virtual Chassis, replace *member-id* with a value of 0 or 1.

**package-name**—Name of the software bundle or package to test.

**scc**—(TX Matrix routers only) (Optional) Validate the software bundle or package for the TX Matrix router (or switch-card chassis).

**set [*package-name package-name*]**—(M Series, MX Series, T Series routers, and Branch SRX Series Services Gateways only) (Optional) Install multiple software packages or software add-on packages at the same time.

**sfc *number***—(TX Matrix Plus routers only) (Optional) Validate the software bundle or package for the TX Matrix Plus router.

**upgrade-with-config**—(Optional) Install one or more configuration files.

**upgrade-with-config-format *format***—(Optional) Specify the configuration file format, **text** or **xml**. The default format is **text**.



**NOTE:** The **upgrade-with-config** and **upgrade-with-config-format** options are only available locally on the router or switch. In a routing matrix, the configuration is applied only to the local router and is not propagated to other routers.

The options are validated during the validation process and applied to the router or switch during the upgrade process. If the upgrade process is successful, the options are removed from the configuration. If the upgrade process fails, the configuration file is renamed with the **.failed** suffix.

---

**Additional Information** By default, when you issue the **request system software validate** command on a TX Matrix master Routing Engine, all the T640 master Routing Engines that are connected to it are validated. If you issue the same command on the TX Matrix backup Routing Engine, all

the T640 backup Routing Engines that are connected to it are upgraded to the same version of software.

Likewise, if you issue the **request system software validate** command on a TX Matrix Plus master Routing Engine, all the T1600 or T4000 master Routing Engines that are connected to it are validated. If you issue the same command on a TX Matrix Plus backup Routing Engine, all the T1600 or T4000 backup Routing Engines that are connected to it are upgraded to the same version of software.

<b>Required Privilege Level</b>	maintenance
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• <i>request system software abort</i></li> <li>• <a href="#">request system software add on page 128</a></li> <li>• <a href="#">request system software delete on page 138</a></li> <li>• <a href="#">request system software rollback on page 142</a></li> <li>• <a href="#">Routing Matrix with a TX Matrix Plus Router Solutions Page</a></li> </ul>
<b>List of Sample Output</b>	<a href="#">request system software validate (Successful Case) on page 149</a> <a href="#">request system software validate (Failure Case) on page 149</a>
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.

## Sample Output

### request system software validate (Successful Case)

```

user@host> request system software validate /var/sw/pkg/jbundle-5.3I20020124_0520_sjg.tgz
Checking compatibility with configuration
Initializing...
Using /packages/jbase-5.3I20020122_1901_sjg
Using /var/sw/pkg/jbundle-5.3I20020124_0520_sjg.tgz
Using /var/chroot/var/tmp/jbundle/jbase-5.3I20020124_0520_sjg.tgz
Using /var/chroot/var/tmp/jbundle/jkernel-5.3I20020124_0520_sjg.tgz
Using /var/chroot/var/tmp/jbundle/jcrypto-5.3I20020124_0520_sjg.tgz
Using /var/chroot/var/tmp/jbundle/jpfe-5.3I20020124_0520_sjg.tgz
Using /var/chroot/var/tmp/jbundle/jdocs-5.3I20020124_0520_sjg.tgz
Using /var/chroot/var/tmp/jbundle/jroute-5.3I20020124_0520_sjg.tgz
Validating against /config/juniper.conf.gz
mgd: commit complete

WARNING: cli has been replaced by an updated version:
CLI release 5.3I0 built by sjg on 2002-01-24 05:23:53 UTC
Restart cli using the new version ? [yes,no] (yes)

```

### request system software validate (Failure Case)

```

user@host> request system software validate 6.3/
Pushing bundle to lcc0-re0
error: Failed to transfer package to lcc0-re0

user@host> request system software validate test

```

```
Pushing bundle to lcc0-re0  
Pushing bundle to lcc2-re0
```

```
lcc0-re0:  
gzip: stdin: not in gzip format  
tar: child returned status 1  
ERROR: Not a valid package: /var/tmp/test
```

## show system auto-snapshot

<b>Syntax</b>	<b>show system auto-snapshot</b>
<b>Release Information</b>	Command introduced in Junos OS Release 12.3 for EX Series switches. Command introduced in Junos OS Release 12.1X45-D10 for SRX Series devices.
<b>Description</b>	Display automatic snapshot status information. When the automatic snapshot feature is enabled and the system reboots from the alternate root partition, the switch automatically takes a snapshot of the root file system in the alternate root partition and copies it onto the primary root partition. This automatic snapshot procedure takes place whenever the system reboots from the alternate partition, regardless of whether the reboot from the alternate partition is due to a command or due to a corruption of the primary partition.
<b>Options</b>	This command has no options.
<b>Required Privilege Level</b>	view
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• <a href="#">Understanding Resilient Dual-Root Partitions on Switches on page 32</a></li> </ul>
<b>List of Sample Output</b>	<a href="#">show system auto-snapshot on page 152</a>
<b>Output Fields</b>	<a href="#">Table 23 on page 151</a> describes the output fields for the <b>show system auto-snapshot</b> command. Output fields are listed in the approximate order in which they appear.

**Table 23: show system auto-snapshot status Output Fields**

Field Name	Field Description
<b>Auto-snapshot configuration</b>	<p>Status of the configuration:</p> <ul style="list-style-type: none"> <li>• <b>Enabled</b>—If the system reboots from the alternate partition, the automatic snapshot feature automatically takes a snapshot of the alternate partition and copies it onto the primary partition.</li> <li>• <b>Disabled</b>—The system does not automatically take a snapshot of the alternate partition. You must use the manual snapshot command, <b>request system snapshot</b>, to take a snapshot of one partition and copy it onto the other.</li> </ul>
<b>Auto-snapshot state</b>	<p>Status of the automatic snapshot procedure:</p> <ul style="list-style-type: none"> <li>• <b>Completed</b>—The automatic snapshot procedure has completed copying the alternate partition to the primary partition and the alarm has been cleared.</li> <li>• <b>Disabled</b>—The automatic snapshot procedure is inactive.</li> <li>• <b>In progress</b>—The automatic snapshot procedure is in progress. It takes about 10 to 15 minutes to complete, depending upon disk size.</li> </ul>

## Sample Output

### show system auto-snapshot

```
user@switch> show system auto-snapshot
Auto-snapshot Configuration: Enabled
Auto-snapshot State: Disabled
```



## show system boot-messages

<b>List of Syntax</b>	<a href="#">Syntax on page 153</a> <a href="#">Syntax (EX Series Switches) on page 153</a> <a href="#">Syntax (TX Matrix Router) on page 153</a> <a href="#">Syntax (TX Matrix Plus Router) on page 153</a> <a href="#">Syntax (MX Series Router) on page 153</a> <a href="#">Syntax (QFX Series) on page 153</a>
<b>Syntax</b>	show system boot-messages
<b>Syntax (EX Series Switches)</b>	show system boot-messages <all-members> <local> <member <i>member-id</i> >
<b>Syntax (TX Matrix Router)</b>	show system boot-messages <all-chassis   all-lcc   lcc <i>number</i>   scc>
<b>Syntax (TX Matrix Plus Router)</b>	show system boot-messages <all-chassis   all-lcc   lcc <i>number</i>   sfc <i>number</i> >
<b>Syntax (MX Series Router)</b>	show system boot-messages <all-members> <local> <member <i>member-id</i> >
<b>Syntax (QFX Series)</b>	show system boot-messages infrastructure <i>name</i>   interconnect-device <i>name</i>   node-group <i>name</i>
<b>Release Information</b>	Command introduced before Junos OS Release 7.4. Command introduced in Junos OS Release 9.0 for EX Series switches. <b>sfc</b> option introduced for the TX Matrix Plus router in Junos OS Release 9.6. Command introduced in Junos OS Release 11.1 for the QFX Series. Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
<b>Description</b>	Display initial messages generated by the system kernel upon startup. These messages are the contents of <code>/var/run/dmesg.boot</code> .
<b>Options</b>	<b>none</b> —Display all boot time messages.  <b>all-chassis</b> —(TX Matrix routers and TX Matrix Plus routers only) (Optional) Display boot time messages for all of the chassis.  <b>all-lcc</b> —(TX Matrix routers and TX Matrix Plus routers only) (Optional) On a TX Matrix router, display boot time messages for all T640 routers connected to a TX Matrix router. On a TX Matrix Plus router, display boot time messages for all connected T1600 or T4000 LCCs.  <b>all-members</b> —(EX4200 switches and MX Series routers only) (Optional) Display boot time messages on all members of the Virtual Chassis configuration.

**infrastructure *name***—(QFabric systems only) (Optional) Display boot time messages on the fabric control Routing Engine or fabric manager Routing engines.

**interconnect-device *name***—(QFabric systems only) (Optional) Display boot time messages on the Interconnect device.

**lcc *number***—(TX Matrix routers and TX Matrix Plus routers only) (Optional) On a TX Matrix router, display boot time messages for a specific T640 router connected to a TX Matrix router. On a TX Matrix Plus router, display boot time messages for a specific router connected to a TX Matrix Plus router.

Replace *number* with the following values depending on the LCC configuration:

- 0 through 3, when T640 routers are connected to a TX Matrix router in a routing matrix.
- 0 through 3, when T1600 routers are connected to a TX Matrix Plus router in a routing matrix.
- 0 through 7, when T1600 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.
- 0, 2, 4, or 6, when T4000 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.

**local**—(EX4200 switches and MX Series routers only) (Optional) Display boot time messages on the local Virtual Chassis member.

**member *member-id***—(EX4200 switches and MX Series routers only) (Optional) Display boot time messages on the specified member of the Virtual Chassis configuration. For EX4200 switches, replace *member-id* with a value from 0 through 9. For an MX Series Virtual Chassis, replace *member-id* with a value of 0 or 1.

**node-group *name***—(QFabric systems only) (Optional) Display boot time messages on the Node group.

**scc**—(TX Matrix routers only) (Optional) Display boot time messages for the TX Matrix router (or switch-card chassis).

**sfc *number***—(TX Matrix Plus routers only) (Optional) Display boot time messages for the TX Matrix Plus router. Replace *number* with 0.

**Additional Information** By default, when you issue the **show system boot-messages** command on the master Routing Engine of a TX Matrix router or a TX Matrix Plus router, the command is broadcast to all the master Routing Engines of the LCCs connected to it in the routing matrix. Likewise, if you issue the same command on the backup Routing Engine of a TX Matrix or a TX Matrix Plus router, the command is broadcast to all backup Routing Engines of the LCCs that are connected to it in the routing matrix.

**Required Privilege Level** view

## Related Documentation

- [Routing Matrix with a TX Matrix Plus Router Solutions Page](#)

## List of Sample Output

[show system boot-messages \(TX Matrix Router\) on page 155](#)  
[show system boot-messages lcc \(TX Matrix Router\) on page 156](#)  
[show system boot-messages \(TX Matrix Plus Router\) on page 157](#)  
[show system boot-messages \(QFX3500 Switch\) on page 157](#)

## Sample Output

### show system boot-messages (TX Matrix Router)

```
user@host> show system boot-messages
Copyright (c) 1992-1998 FreeBSD Inc.
Copyright (c) 1996-2000 Juniper Networks, Inc.
All rights reserved.
Copyright (c) 1982, 1986, 1989, 1991, 1993
    The Regents of the University of California. All rights reserved.

JUNOS 4.1-20000216-Zf8469 #0: 2000-02-16 12:57:28 UTC
    tlim@device1.example.com:/p/build/20000216-0905/4.1/release_kernel/sys/compile/GENERIC
CPU: Pentium Pro (332.55-MHz 686-class CPU)
    Origin = "GenuineIntel" Id = 0x66a Stepping=10
    Features=0x183f9ff<FPU,VME,DE,PSE,TSC,MSR,PAE,MCE,CX8,SEP,MTRR,PGE,MCA,CMOV,<b
16>,<b17>,MMX,<b24>>
Teknor CPU Card Recognized
real memory = 805306368 (786432K bytes)
avail memory = 786280448 (767852K bytes)
Probing for devices on PCI bus 0:
chip0 <generic PCI bridge (vendor=8086 device=7192 subclass=0)> rev 3 class 6000
0 on pci0:0:0
chip1 <Intel 82371AB PCI-ISA bridge> rev 1 class 60100 on pci0:7:0
chip2 <Intel 82371AB IDE interface> rev 1 class 10180 on pci0:7:1
chip3 <Intel 82371AB USB interface> rev 1 class c0300 int d irq 11 on pci0:7:2
smb0 <Intel 82371AB SMB controller> rev 1 class 68000 on pci0:7:3
pcic0 <TI PCI-1131 PCI-CardBus Bridge> rev 1 class 60700 int a irq 15 on pci0:13
:0
TI1131 PCI Config Reg: [pci only][FUNC0 pci int]
pcic1 <TI PCI-1131 PCI-CardBus Bridge> rev 1 class 60700 int b irq 12 on pci0:13
:1
TI1131 PCI Config Reg: [pci only][FUNC1 pci int]
fxp0 <Intel EtherExpress Pro 10/100B Ethernet> rev 8 class 20000 int a irq 12 on

pci0:16:0
chip4 <generic PCI bridge (vendor=1011 device=0022 subclass=4)> rev 4 class 6040
0 on pci0:17:0
fxp1 <Intel EtherExpress Pro 10/100B Ethernet> rev 8 class 20000 int a irq 10 on

pci0:19:0
Probing for devices on PCI bus 1:
mcs0 <Miscellaneous Control Subsystem> rev 12 class ff0000 int a irq 12 on pci1:
13:0
fxp2 <Intel EtherExpress Pro 10/100B Ethernet> rev 8 class 20000 int a irq 10 on

pci1:14:0
Probing for devices on the ISA bus:
sc0 at 0x60-0x6f irq 1 on motherboard
sc0: EGA color <16 virtual consoles, flags=0x0>
ed0 not found at 0x300
```

```

ed1 not found at 0x280
ed2 not found at 0x340
psm0 not found at 0x60
sio0 at 0x3f8-0x3ff irq 4 flags 0x20010 on isa
sio0: type 16550A, console
sio1 at 0x3e8-0x3ef irq 5 flags 0x20000 on isa
sio1: type 16550A
sio2 at 0x2f8-0x2ff irq 3 flags 0x20000 on isa
sio2: type 16550A
pcic0 at 0x3e0-0x3e1 on isa
PC-Card ctlr(0) TI PCI-1131 [CardBus bridge mode] (5 mem & 2 I/O windows)
pcic0: slot 0 controller I/O address 0x3e0
npx0 flags 0x1 on motherboard
npx0: INT 16 interface
fdc0: direction bit not set
fdc0: cmd 3 failed at out byte 1 of 3
fdc0 not found at 0x3f0
wdc0 at 0x1f0-0x1f7 irq 14 on isa
wdc0: unit 0 (wd0): <SunDisk SQFXB-80>, single-sector-i/o
wd0: 76MB (156672 sectors), 612 cyls, 8 heads, 32 S/T, 512 B/S
wdc0: unit 1 (wd1): <IBM-DCXA-210000>
wd1: 8063MB (16514064 sectors), 16383 cyls, 16 heads, 63 S/T, 512 B/S
wdc1 not found at 0x170
wdc2 not found at 0x180
ep0 not found at 0x300
fxp0: Ethernet address 00:a0:a5:12:05:5a
fxp1: Ethernet address 00:a0:a5:12:05:59
fxp2: Ethernet address 02:00:00:00:00:01
swapon: adding /dev/wd1s1b as swap device
Automatic reboot in progress...
/dev/rwd0s1a: clean, 16599 free (95 frags, 2063 blocks, 0.1% fragmentation)
/dev/rwd0s1e: clean, 9233 free (9 frags, 1153 blocks, 0.1% fragmentation)
/dev/rwd0s1a: clean, 16599 free (95 frags, 2063 blocks, 0.1% fragmentation)
/dev/rwd1s1f: clean, 4301055 free (335 frags, 537590 blocks, 0.0% fragmentation)

```

### show system boot-messages lcc (TX Matrix Router)

```

user@host> show system boot-messages lcc 2
lcc2-re0:
-----
Copyright (c) 1996-2001, Juniper Networks, Inc.
All rights reserved.
Copyright (c) 1992-2001 The FreeBSD Project.
Copyright (c) 1979, 1980, 1983, 1986, 1988, 1989, 1991, 1992, 1993, 1994
    The Regents of the University of California. All rights reserved.
JUNOS 7.0-20040912.0 #0: 2004-09-12 09:16:32 UTC

builder@device1.example.com:/build/benten-b/7.0/20040912.0/obj-i386/sys/compile/JUNIPER
Timecounter "i8254" frequency 1193182 Hz
Timecounter "TSC" frequency 601368936 Hz
CPU: Pentium III/Pentium III Xeon/Celeron (601.37-MHz 686-class CPU)
    Origin = "GenuineIntel" Id = 0x68a Stepping = 10

Features=0x387f9ff<FPU,VME,DE,PSE,TSC,MSR,PAE,MCE,CX8,SEP,MTRR,PGE,MCA,CMOV,PAT,PSE36,PN,MMX,FXSR,SSE>
real memory = 2147467264 (2097136K bytes)
sio0: gdb debugging port
avail memory = 2084040704 (2035196K bytes)
Preloaded elf kernel "kernel" at 0xc06d9000.
DEVFS: ready for devices
Pentium Pro MTRR support enabled
md0: Malloc disk

```

```

DRAM Data Integrity Mode: ECC Mode with h/w scrubbing
npx0: <math processor> on motherboard
npx0: INT 16 interface
pcib0: <ServerWorks NB6635 3.0LE host to PCI bridge> on motherboard
pci0: <PCI bus> on pcib0
pcic-pci0: <TI PCI-1410 PCI-CardBus Bridge> irq 15 at device 1.0 on pci0
pcic-pci0: TI12XX PCI Config Reg: [pwr save][pci only]
fxp0: <Intel Embedded 10/100 Ethernet> port 0x1000-0x103f mem
0xfb800000-0xfb81ffff,0xfb820000-0xfb820fff irq 9 at device 3.0 on pci0
fxp1: <Intel Embedded 10/100 Ethernet> port 0x1040-0x107f mem
0xfb840000-0xfb85ffff,0xfb821000-0xfb821fff irq 11 at device 4.0 on pci0
...

```

### show system boot-messages (TX Matrix Plus Router)

```

user@host> show system boot-messages
sfc0-re0:
-----
Copyright (c) 1996-2009, Juniper Networks, Inc.
All rights reserved.
Copyright (c) 1992-2006 The FreeBSD Project.
Copyright (c) 1979, 1980, 1983, 1986, 1988, 1989, 1991, 1992, 1993, 1994
    The Regents of the University of California. All rights reserved.
JUNOS 9.6B3.3 #0: 2009-06-17 19:52:08 UTC

builder@device1.example.com:/volume/build/junos/9.6/release/9.6B3.3/obj-i386/bsd/sys/compile/JUNIPER
MPTable: Timecounter "i8254" frequency 1193182 Hz quality 0 CPU: Intel(R) Xeon(R)
CPU          L5238 @ 2.66GHz (2660.01-MHz 686-class CPU)   Origin =
"GenuineIntel" Id = 0x1067a Stepping = 10   Features=0xbfebfbff
...
lcc1-re0:
-----
Copyright (c) 1996-2009, Juniper Networks, Inc.
All rights reserved.
Copyright (c) 1992-2006 The FreeBSD Project.
Copyright (c) 1979, 1980, 1983, 1986, 1988, 1989, 1991, 1992, 1993, 1994
    The Regents of the University of California. All rights reserved.
JUNOS 9.6-20090617.0 #0: 2009-06-17 04:15:14 UTC

builder@device1.example.com:/volume/build/junos/9.6/production/20090617.0/obj-i386/bsd/sys/compile/JUNIPER
Timecounter "i8254" frequency 1193182 Hz quality 0
CPU: Intel(R) Xeon(R) CPU                               @ 1.86GHz (1862.01-MHz 686-class CPU)

Origin = "GenuineIntel" Id = 0x1067a Stepping = 10
Features=0xbfebfbff
...

```

### show system boot-messages (QFX3500 Switch)

```

user@switch> show sytem boot-messages
getmemsize: msgbufp[size=32768] = 0x81d07fe4

System physical memory distribution:
-----
Total physical memory: 4160749568 (3968 MB)
Physical memory used: 3472883712 (3312 MB)
Physical memory allocated to kernel: 2130706432 (2032 MB)
Physical memory allocated to user BTLB: 1342177280 (1280 MB)
-----

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```

```
All rights reserved.
Copyright (c) 1992-2006 The FreeBSD Project.
Copyright (c) 1979, 1980, 1983, 1986, 1988, 1989, 1991, 1992, 1993, 1994
    The Regents of the University of California. All rights reserved.
JUNOS 11.1I #0: 2010-09-17 19:18:07 UTC
    user@device1.example.com:/c/user/DEV_BRANCH/03/20100917.399988/
obj-xlr/bsd/sys/compile/JUNIPER-DCTOR
WARNING: debug.mpsafenet forced to 0 as ipsec requires Giant
JUNOS 11.1I #0: 2010-09-17 19:18:07 UTC
    user@device.net:/c/test/DEV_BRANCH/03/20100917.399988/
obj-xlr/bsd/sys/compile/JUNIPER-DCTOR
real memory = 3472883712 (3312MB)
avail memory = 1708171264 (1629MB)
cpuid: 0, btlb_cpumap:0xffffffff8
FreeBSD/SMP: Multiprocessor System Detected: 12 CPUs
ETHERNET SOCKET BRIDGE initialising
Initializing QFX platform properties ..
cpu0 on motherboard
: RMI's XLR CPU Rev. 0.3 with no FPU implemented
    L1 Cache: I size 32kb(32 line), D size 32kb(32 line), eight way.
    L2 Cache: Size 1024kb, eight way
pic_lbus0: <XLR Local Bus>
pic_lbus0: <XLR Local Bus> on motherboard
Enter qfx control ethernet probe addr:0xc5eeec00
gmac4: <XLR GMAC GE Ethernet> on pic_lbus0
me0: Ethernet address 00:1d:b5:f7:68:40
Enter qfx control ethernet probe addr:0xc5eeeb40
gmac5: <XLR GMAC GE Ethernet> on pic_lbus0
me1: Ethernet address 00:1d:b5:f7:68:41
Enter qfx control ethernet probe addr:0xc5eeea80
gmac6: <XLR GMAC GE Ethernet> on pic_lbus0
me1: Ethernet address 00:1d:b5:f7:68:42
sio0 on pic_lbus0
Entering sioattach
sio0: type 16550A, console
xls_setup_intr: skip irq 3, xlr regs are set up somewhere else.
gblmem0 on pic_lbus0
ehci0: <RMI XLS USB 2.0 controller> on pic_lbus0
ehci_bus_attach: allocated resource. tag=1, base=bef24000
xls_ehci_init: endian hardware swapping NOT enabled.
usb0: EHCI version 1.0
usb0 on ehci0
usb0: USB revision 2.0
uhub0: vendor 0x0000 EHCI root hub, class 9/0, rev 2.00/1.00, addr 1
uhub0: 2 ports with 2 removable, self powered
umass0: USB USBFlashDrive, rev 2.00/11.00, addr 2
pcib0: PCIe link 0 up
pcib0: PCIe link 2 up
pcib0: PCIe link 3 up
pcib0: <XLS PCI Host Controller> on pic_lbus0
pci0: <PCI bus> on pcib0
pcib1: <PCI-PCI bridge> at device 0.0 on pci0
pci1: <PCI bus> on pcib1
pci1: <network, ethernet> at device 0.0 (no driver attached)
pcib2: <PCI-PCI bridge> at device 1.0 on pci0
pcib3: <PCI-PCI bridge> at device 2.0 on pci0
pci2: <PCI bus> on pcib3
pci2: <network, ethernet> at device 0.0 (no driver attached)
pcib4: <PCI-PCI bridge> at device 3.0 on pci0
pci3: <PCI bus> on pcib4
pci3: <network, ethernet> at device 0.0 (no driver attached)
```

```

cfi device address space at 0xbc000000
cfi0: <AMD/Fujitsu - 8MB> on pic_lbus0
cfi device address space at 0xbc000000
i2c0: <I2C bus controller> on pic_lbus0
i2c1: <I2C bus controller> on pic_lbus0
qfx_fmn0 on pic_lbus0
pool offset 1503776768
xlr_lbus0: <XLR Local Bus Controller> on motherboard
qfx_bcpld_probe[124]
qfx_bcpld_probe[138]: dev_type=0x0
qfx_bcpld_probe[124]
qfx_bcpld0: QFX BCPLD probe success
qfx_bcpld0qfx_bcpld_attach[174]
qfx_bcpld_attach[207] : bus_space_tag=0x0, bus_space_handle=0xbd900000
qfx_bcpld_probe[124]
qfx_bcpld1: QFX BCPLD probe success
qfx_bcpld1qfx_bcpld_attach[174]
tor_bcpld_slave_attach[1245] : bus_space_tag=0x0, bus_space_handle=0xbda00000
Initializing product: 96 ..
bmeb: bmeb_lib_init done 0xc60a5000, addr 0x809c99a0
bme0:Virtual BME driver initializing
Timecounter "mips" frequency 1200000000 Hz quality 0
Timecounter "xlr_pic_timer" frequency 66666666 Hz quality 1
Timecounters tick every 1.000 msec
Loading the NETPFE fc module
IPsec: Initialized Security Association Processing.
SMP: AP CPU #3 Launched!
SMP: AP CPU #1 Launched!
SMP: AP CPU #2 Launched!
SMP: AP CPU #4 Launched!
SMP: AP CPU #5 Launched!
SMP: AP CPU #7 Launched!
SMP: AP CPU #6 Launched!
SMP: AP CPU #11 Launched!
SMP: AP CPU #10 Launched!
SMP: AP CPU #9 Launched!
SMP: AP CPU #8 Launched!
da0 at umass-sim0 bus 0 target 0 lun 0
da0: <USB USBFlashDrive 1100> Removable Direct Access SCSI-0 device
da0: 40.000MB/s transfers
da0: 3920MB (8028160 512 byte sectors: 255H 63S/T 499C)
Trying to mount root from ufs:/dev/da0s1a

```

## show system license

---

<b>Syntax</b>	<code>show system license</code> <code>&lt;installed   keys   usage&gt;</code>
<b>Release Information</b>	Command introduced before Junos OS Release 7.4. Command introduced in Junos OS Release 9.0 for EX Series switches. Command introduced in Junos OS Release 11.1 for the QFX Series. Command introduced in Junos OS Release 13.3 for the MX104 3D Universal Edge Routers.
<b>Description</b>	Display licenses and information about how they are used.
<b>Options</b>	<b>none</b> —Display all license information.  <b>installed</b> —(Optional) Display installed licenses only.  <b>keys</b> —(Optional) Display a list of license keys. Use this information to verify that each expected license key is present.  <b>usage</b> —(Optional) Display the state of licensed features.
<b>Required Privilege Level</b>	maintenance
<b>List of Sample Output</b>	<a href="#">show system license on page 161</a> <a href="#">show system license installed on page 162</a> <a href="#">show system license keys on page 162</a> <a href="#">show system license usage on page 162</a> <a href="#">show system license (MX104 Routers) on page 162</a> <a href="#">show system license installed (MX104 Routers) on page 163</a> <a href="#">show system license keys (MX104 Routers) on page 163</a> <a href="#">show system license usage (MX104 Routers) on page 163</a> <a href="#">show system license (MX104 Routers) on page 163</a> <a href="#">show system license installed (MX104 Routers) on page 164</a> <a href="#">show system license keys (MX104 Routers) on page 164</a> <a href="#">show system license usage (MX104 Routers) on page 165</a> <a href="#">show system license (MX104 Routers) on page 165</a> <a href="#">show system license installed (MX104 Routers) on page 165</a> <a href="#">show system license keys (MX104 Routers) on page 166</a> <a href="#">show system license usage (MX104 Routers) on page 166</a> <a href="#">show system license (QFX Series) on page 166</a> <a href="#">show system license (QFX5110 Switch with Disaggregated Feature License) on page 166</a>
<b>Output Fields</b>	Table 24 on page 161 lists the output fields for the <b>show system license</b> command. Output fields are listed in the approximate order in which they appear.



Table 24: show system license Output Fields

Field Name	Field Description
<b>Feature name</b>	Name assigned to the configured feature. You use this information to verify that all the features for which you installed licenses are present.
<b>Licenses used</b>	<p>Number of licenses used by a router or switch. You use this information to verify that the number of licenses used matches the number configured. If a licensed feature is configured, the feature is considered used.</p> <p><b>NOTE:</b> In Junos OS Release 10.1 and later, the <b>Licenses used</b> column displays the actual usage count based on the number of active sessions or connections as reported by the corresponding feature daemons. This is applicable for scalable license-based features such as Subscriber Access (<b>scale-subscriber</b>), L2TP (<b>scale-l2tp</b>), Mobile IP (<b>scale-mobile-ip</b>), and so on.</p>
<b>Licenses installed</b>	<p>Information about the installed license key:</p> <ul style="list-style-type: none"> <li>• <b>License identifier</b>—Identifier associated with a license key.</li> <li>• <b>State</b>—State of the license key: <b>valid</b> or <b>invalid</b>. An <b>invalid</b> state indicates that the key was entered incorrectly or is not valid for the specific device.</li> <li>• <b>License version</b>—Version of a license. The version indicates how the license is validated, the type of signature, and the signer of the license key.</li> <li>• <b>Software Serial Number</b>—Serial number of the disaggregated software feature license. License Management System (LMS) uses the software serial number, not the chassis ID, to generate a disaggregated feature license.</li> <li>• <b>Customer ID</b>—what is this exactly?</li> <li>• <b>Valid for device</b>—Device that can use a license key.</li> <li>• <b>Group defined</b>—Group membership of a device.</li> <li>• <b>Features</b>—Feature associated with a license, such as data link switching (DLSw).</li> </ul>
<b>Licenses needed</b>	Number of licenses required for features being used but not yet properly licensed.
<b>Expiry</b>	Amount of time left within the grace period before a license is required for a feature being used.

## Sample Output

### show system license

```
user@host> show system license
```

```
License usage:
```

Feature name	Licenses used	Licenses installed	Licenses needed	Expiry
subscriber-accounting	2	2	0	permanent
subscriber-authentication	1	2	0	permanent
subscriber-address-assignment	2	2	0	permanent
subscriber-vlan	2	2	0	permanent
subscriber-ip	0	2	0	permanent
scale-subscriber	2	3	0	permanent
scale-l2tp	4	5	0	permanent
scale-mobile-ip	1	2	0	permanent

```
Licenses installed:
```

```
License identifier: XXXXXXXXXX
```

```
License version: 2
```

**Features:**

```

subscriber-accounting - Per Subscriber Radius Accounting
    permanent
subscriber-authentication - Per Subscriber Radius Authentication
    permanent
subscriber-address-assignment - Radius/SRC Address Pool Assignment
    permanent
subscriber-vlan - Dynamic Auto-sensed Vlan
    permanent
subscriber-ip - Dynamic and Static IP
    permanent

```

**show system license installed**

```

user@host> show system license installed
License identifier: XXXXXXXXXX
License version: 2
Features:
subscriber-accounting - Per Subscriber Radius Accounting
    permanent
subscriber-authentication - Per Subscriber Radius Authentication
    permanent
subscriber-address-assignment - Radius/SRC Address Pool Assignment
    permanent
subscriber-vlan - Dynamic Auto-sensed Vlan
    permanent
subscriber-ip - Dynamic and Static IP
    permanent

```

**show system license keys**

```

user@host> show system license keys
XXXXXXXXXX xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx
          xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx
          xxxxxx xxxxxx xxx

```

**show system license usage**

```

user@host> show system license usage
License usage:

```

Feature name	Licenses used	Licenses installed	Licenses needed	Expiry
subscriber-accounting	2	2	0	permanent
subscriber-authentication	1	2	0	permanent
subscriber-address-assignment	2	2	0	permanent
subscriber-vlan	2	2	0	permanent
subscriber-ip	0	2	0	permanent
scale-subscriber	2	3	0	permanent
scale-l2tp	4	5	0	permanent
scale-mobile-ip	1	2	0	permanent

**show system license (MX104 Routers)**

In the following output, ports 0 and 1 are activated by installing the license to activate the first two built-in ports.

```

user@host> show system license
License usage:

```

Feature name	Licenses used	Licenses installed	Licenses needed	Expiry
scale-subscriber	0	1000	0	permanent

scale-l2tp	0	1000	0	permanent
scale-mobile-ip	0	1000	0	permanent
MX104-2x10Gig-port-0-1	0	1	0	permanent

Licenses installed:

License identifier: XXXXXXXXXX

License version: 2

Features:

MX104-2x10Gig-port-0-1 - MX104 2X10Gig Builtin Port(xe-2/0/0 & xe-2/0/1)

upgrade

permanent

### show system license installed (MX104 Routers)

In the following output, ports 0 and 1 are activated by installing the license to activate the first two built-in ports.

user@host > show system license installed

License identifier: XXXXXXXXXX

License version: 2

Features:

MX104-2x10Gig-port-0-1 - MX104 2X10Gig Builtin Port(xe-2/0/0 & xe-2/0/1)

upgrade

permanent

### show system license keys (MX104 Routers)

In the following output, ports 0 and 1 are activated by installing the license to activate the first two built-in ports.

user@host > show system license keys

```
XXXXXXXXXX xxxxxxx xxxxxxx xxxxxxx xxxxxxx xxxxxxx xxxxxxx
            xxxxxxx xxxxxxx xxxxxxx xxxxxxx xxxxxxx xxxxxxx
            xxxxxxx xxxxx
```

### show system license usage (MX104 Routers)

In the following output, ports 0 and 1 are activated by installing the license to activate the first two built-in ports.

user@host > show system license usage

Feature name	Licenses used	Licenses installed	Expiry	needed	
scale-subscriber	0	1000		0	permanent
scale-l2tp	0	1000		0	permanent
scale-mobile-ip	0	1000		0	permanent
MX104-2x10Gig-port-0-1	0	1		0	permanent

### show system license (MX104 Routers)

In the following output, ports 2 and 3 are activated by installing the license to activate the next two built-in ports after installing the license to activate the first two built-in ports.

user@host > show system license

License usage:

Feature name	Licenses used	Licenses installed	Licenses needed	Expiry
scale-subscriber	0	1000	0	permanent

scale-l2tp	0	1000	0	permanent
scale-mobile-ip	0	1000	0	permanent
MX104-2x10Gig-port-0-1	0	1	0	permanent
MX104-2x10Gig-port-2-3	0	1	0	permanent

#### Licenses installed:

License identifier: XXXXXXXXXX

License version: 2

#### Features:

MX104-2x10Gig-port-0-1 - MX104 2X10Gig Builtin Port(xe-2/0/0 & xe-2/0/1)

#### upgrade

permanent

License identifier: XXXXXXXXXX

License version: 2

#### Features:

MX104-2x10Gig-port-2-3 - MX104 2X10Gig Builtin Port(xe-2/0/2 & xe-2/0/3)

#### upgrade

permanent

### show system license installed (MX104 Routers)

In the following output, ports 2 and 3 are activated by installing the license to activate the next two built-in ports after installing the license to activate the first two built-in ports.

```
user@host > show system license installed
```

License identifier: XXXXXXXXXX

License version: 2

#### Features:

MX104-2x10Gig-port-0-1 - MX104 2X10Gig Builtin Port(xe-2/0/0 & xe-2/0/1)

#### upgrade

permanent

License identifier: XXXXXXXXXX

License version: 2

#### Features:

MX104-2x10Gig-port-2-3 - MX104 2X10Gig Builtin Port(xe-2/0/2 & xe-2/0/3)

#### upgrade

permanent

### show system license keys (MX104 Routers)

In the following output, ports 2 and 3 are activated by installing the license to activate the next two built-in ports after installing the license to activate the first two built-in ports.

```
user@host > show system license keys
```

```
XXXXXXXXXX xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx
          xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx
          xxxxxx xxxx
```

```
XXXXXXXXXX xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx
          xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx
          xxxxxx xxxx
```

**show system license usage (MX104 Routers)**

In the following output, ports 2 and 3 are activated by installing the license to activate the next two built-in ports after installing the license to activate the first two built-in ports.

```
user@host > show system license usage
```

Feature name	Licenses used	Licenses installed	Licenses needed	Expiry
scale-subscriber	0	1000	0	permanent
scale-l2tp	0	1000	0	permanent
scale-mobile-ip	0	1000	0	permanent
MX104-2x10Gig-port-0-1	0	1	0	permanent
MX104-2x10Gig-port-2-3	0	1	0	permanent

**show system license (MX104 Routers)**

In the following output, ports 0,1,2, and 3 are activated by installing a single license key to activate all four built-in ports.

```
user@host > show system license
```

License usage:

Feature name	Licenses used	Licenses installed	Licenses needed	Expiry
scale-subscriber	0	1000	0	permanent
scale-l2tp	0	1000	0	permanent
scale-mobile-ip	0	1000	0	permanent
MX104-2x10Gig-port-0-1	0	1	0	permanent
MX104-2x10Gig-port-2-3	0	1	0	permanent

```
Licenses installed:
License identifier: XXXXXXXXXX
License version: 2
Features:
  MX104-2x10Gig-port-0-1 - MX104 2X10Gig Builtin Port(xe-2/0/0 & xe-2/0/1)
upgrade
  permanent
  MX104-2x10Gig-port-2-3 - MX104 2X10Gig Builtin Port(xe-2/0/2 & xe-2/0/3)
upgrade
  permanent
```

**show system license installed (MX104 Routers)**

In the following output, ports 0,1,2, and 3 are activated by installing a single license key to activate all four built-in ports.

```
user@host > show system license installed
License identifier: XXXXXXXXXX
License version: 2
Features:
  MX104-2x10Gig-port-0-1 - MX104 2X10Gig Builtin Port(xe-2/0/0 & xe-2/0/1)
upgrade
  permanent
  MX104-2x10Gig-port-2-3 - MX104 2X10Gig Builtin Port(xe-2/0/2 & xe-2/0/3)
upgrade
  permanent
```

### show system license keys (MX104 Routers)

In the following output, ports 0,1,2, and 3 are activated by installing a single license key to activate all four built-in ports.

```
user@host > show system license keys
```

```
XXXXXXXXX  xxxxxx  xxxxxx  xxxxxx  xxxxxx  xxxxxx
            xxxxxx  xxxxxx  xxxxxx  xxxxxx  xxxxxx
            xxxxxx  xxxxxx  x
```

### show system license usage (MX104 Routers)

In the following output, ports 0,1,2, and 3 are activated by installing a single license key to activate all four built-in ports.

```
user@host > show system license usage
```

Feature name	Licenses used	Licenses installed	Expiry	needed	
scale-subscriber	0	1000		0	permanent
scale-l2tp	0	1000		0	permanent
scale-mobile-ip	0	1000		0	permanent
MX104-2x10Gig-port-0-1	0	1		0	permanent
MX104-2x10Gig-port-2-3	0	1		0	permanent

### show system license (QFX Series)

```
user@switch> show system license
```

License usage:

Feature name	Licenses used	Licenses installed	Licenses needed	Expiry
qfx-edge-fab	1	1	1	permanent

Licenses installed:

License identifier: JUNOS417988

License version: 1

Features:

```
qfx-edge-fab - QFX3000 Series QF/Node feature license
permanent
```

### show system license (QFX5110 Switch with Disaggregated Feature License)

```
user@switch> show system license
```

License usage:

Feature name	Licenses used	Licenses installed	Licenses needed	Expiry
bgp	0	1	0	2017-07-05
00:00:00 UTC				
isis	0	1	0	2017-07-05
00:00:00 UTC				
vxlان	0	1	0	2017-07-05
00:00:00 UTC				
ovsdb	0	1	0	2017-07-05
00:00:00 UTC				
jbs1	0	1	0	2017-07-02
00:00:00 UTC				
upgrade1	0	1	0	2017-07-05
00:00:00 UTC				

Licenses installed:

License identifier: JUNOS797095

```
License version: 4
Software Serial Number: 91730A00223925
Customer ID: Juniper
Features:
  JUNOS-BASE-SERVICES-CLASS-1 - QFX Junos Base Services license for Class 1 HW
    date-based, 2016-07-01 00:00:00 UTC - 2017-07-02 00:00:00 UTC

License identifier: JUNOS797646
License version: 4
Software Serial Number: 91730A00224207
Customer ID: Juniper
Features:
  CLASS-1-JUNOS-BASE-ADVANCED-UPGRADE - Class 1 Junos Base to Advanced Services
  Upgrade
    date-based, 2016-07-04 00:00:00 UTC - 2017-07-05 00:00:00 UTC

{master:0}
```

## show system snapshot

---

**List of Syntax**    [Syntax on page 168](#)  
                         [Syntax \(EX Series Switches\) on page 168](#)

**Syntax**    show system snapshot

**Syntax (EX Series Switches)**    show system snapshot  
   <all-members|local|member *member-id*>  
   <media (external | internal)>

**Release Information**    Command introduced in Junos OS Release 7.6.  
                                 Command introduced in Junos OS Release 10.0 for EX Series switches.  
                                 Option **slice** deprecated for Junos OS with Upgraded FreeBSD in Junos OS Release 15.1.



**NOTE:** To determine which platforms run Junos OS with Upgraded FreeBSD, see the table listing the platforms currently running Junos OS with upgraded FreeBSD in *Understanding Junos OS with Upgraded FreeBSD*.

---

**Description**    Display information about the backup software:

- On the routers, display information about the backup software, which is located in the **/altroot**, and **/altconfig** file systems or on the alternate media.
- On the switches, display information about the backup of the root file system (**/**) and directories **/altroot**, **/config**, **/var**, and **/var/tmp**, which are located either on an external USB flash drive or in internal flash memory.



**NOTE:** To back up software, use the **request system snapshot** command.

---

**Options**    **none**—Display information about the backup software.

**all-members | local | member *member-id***—(EX Series switch Virtual Chassis only)  
(Optional) Display the snapshot in a Virtual Chassis:

- **all-members**—Display the snapshot for all members of the Virtual Chassis.
- **local**—Display the snapshot on the member of the Virtual Chassis that you are currently logged into.
- **member *member-id***—Display the snapshot for the specified member of the Virtual Chassis.

**media (external | internal)**—(EX Series switch only) (Optional) Display the destination media location for the snapshot. The **external** option specifies the snapshot on an external mass storage device, such as a USB flash drive. The **internal** option specifies



the snapshot on an internal memory source, such as internal flash memory. If no additional options are specified, the command displays the snapshot stored in both slices.

**Required Privilege Level** view

**Related Documentation** • [request system snapshot on page 116](#)

**List of Sample Output** [show system snapshot \(Router\) on page 169](#)  
[show system snapshot media external \(Switch\) on page 169](#)  
[show system snapshot media internal \(Switch\) on page 170](#)

**Output Fields** [Table 25 on page 169](#) lists the output fields for the **show system snapshot** command. Output fields are listed in the approximate order in which they appear.

**Table 25: show system snapshot Output Fields**

Field Name	Field Description
Creation date	Date and time of the last snapshot.
JUNOS version on snapshot	Junos OS release number of individual software packages.

## Sample Output

### show system snapshot (Router)

```
user@host> show system snapshot
Information for snapshot on hard-disk
Creation date: Oct 5 13:53:29 2005
JUNOS version on snapshot:
  jbase : 7.3R2.5
  jcrypto: 7.3R2.5
  jdocs : 7.3R2.5
  jkernel: 7.3R2.5
  jpfe : M40-7.3R2.5
  jroute : 7.3R2.5
```

### show system snapshot media external (Switch)

```
user@switch> show system snapshot media external
Information for snapshot on external (/dev/dals1a) (backup)
Creation date: Mar 19 03:37:18 2012
JUNOS version on snapshot:
  jbase : ex-12.1I20120111_0048_user
  jcrypto-ex: 12.1I20120111_0048_user
  jdocs-ex: 12.1I20120111_0048_user
  jroute-ex: 12.1I20120111_0048_user
  jswitch-ex: 12.1I20120111_0048_user
  jweb-ex: 12.1I20120111_0048_user
Information for snapshot on external (/dev/dals2a) (primary)
Creation date: Mar 19 03:38:25 2012
JUNOS version on snapshot:
  jbase : ex-12.2I20120305_2240_user
```

```
jcrypto-ex: 12.2I20120305_2240_user
jdocs-ex: 12.2I20120305_2240_user
jroute-ex: 12.2I20120305_2240_user
jswitch-ex: 12.2I20120305_2240_user
jweb-ex: 12.2I20120305_2240_user
```

#### show system snapshot media internal (Switch)

```
user@switch> show system snapshot media internal
Information for snapshot on internal (/dev/da0s1a) (backup)
Creation date: Mar 14 05:01:02 2011
JUNOS version on snapshot:
  jbase : 11.1R1.9
  jcrypto-ex: 11.1R1.9
  jdocs-ex: 11.1R1.9
  jkernel-ex: 11.1R1.9
  jroute-ex: 11.1R1.9
  jswitch-ex: 11.1R1.9
  jweb-ex: 11.1R1.9
  jpfe-ex42x: 11.1R1.9
Information for snapshot on internal (/dev/da0s2a) (primary)
Creation date: Mar 30 08:46:27 2011
JUNOS version on snapshot:
  jbase : 11.2-20110330.0
  jcrypto-ex: 11.2-20110330.0
  jdocs-ex: 11.2-20110330.0
  jkernel-ex: 11.2-20110330.0
  jroute-ex: 11.2-20110330.0
  jswitch-ex: 11.2-20110330.0
  jweb-ex: 11.2-20110330.0
  jpfe-ex42x: 11.2-20110330.0
```

## show system storage partitions (EX Series Switches Only)

<b>Syntax</b>	show system storage partitions <all-members> <local> <member <i>member-id</i> >
<b>Release Information</b>	Command introduced in Junos OS Release 11.1 for EX Series switches.
<b>Description</b>	Display information about the disk partitions on EX Series switches.
<b>Options</b>	<p><b>none</b>—Display partition information.</p> <p><b>all-members</b>—(Virtual Chassis systems only) (Optional) Display partition information for all members of the Virtual Chassis.</p> <p><b>local</b>—(Virtual Chassis systems only) (Optional) Display partition information for the local Virtual Chassis member.</p> <p><b>member <i>member-id</i></b>—(Virtual Chassis systems only) (Optional) Display partition information for the specified member of the Virtual Chassis configuration.</p>
<b>Required Privilege Level</b>	view
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• <a href="#">Verifying Junos OS and Boot Loader Software Versions on an EX Series Switch on page 59</a></li> </ul>
<b>List of Sample Output</b>	<a href="#">show system storage partitions on page 172</a>
<b>Output Fields</b>	<a href="#">Table 26 on page 171</a> describes the output fields for the <b>show system storage partitions</b> command. Output fields are listed in the approximate order in which they appear.

**Table 26: show system storage partitions Output Fields**

Field Name	Field Description
Boot Media	Media (internal or external) from which the switch was booted.
Active Partition	Name of the active root partition.
Backup Partition	Name of the backup (alternate) root partition.
Currently booted from	Partition from which the switch was last booted.
Partitions information	Information about partitions on the boot media: <ul style="list-style-type: none"> <li>• Partition—Partition identifier.</li> <li>• Size—Size of partition.</li> <li>• Mountpoint—Directory on which the partition is mounted.</li> </ul>


## Sample Output

### show system storage partitions

```
user@switch> show system storage partitions
fpc0:
-----
Boot Media: internal (da0)
Active Partition: da0s1a
Backup Partition: da0s2a
Currently booted from: active (da0s1a)

Partitions information:
  Partition  Size  Mountpoint
  s1a        184M  /
  s2a        184M  altroot
  s3d        369M  /var/tmp
  s3e        123M  /var
  s4d         62M  /config
  s4e                unused (backup config)
```

## show system snapshot (Junos OS with Upgraded FreeBSD)

<b>Syntax</b>	show system snapshot
<b>Release Information</b>	Command introduced in Junos OS Release 15.1 for MX240, MX480, MX960, MX2010, and MX2020 routers and EX9200 switches. Command introduced in Junos OS Release 15.1X53-D30 for QFX5200 switches.
<b>Description</b>	Display information about the non-recovery backup software, which is located in the <b>junos</b> file system on the hard disk drive or solid-state drive (SSD).
<div>  <b>NOTE:</b> To back up software, use the <code>request system snapshot</code> command.         </div>	
<b>Required Privilege Level</b>	view
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• <a href="#">request system snapshot (Junos OS with Upgraded FreeBSD) on page 123</a></li> <li>• <a href="#">request system reboot (Junos OS with Upgraded FreeBSD) on page 125</a></li> <li>• <i>Understanding Junos OS with Upgraded FreeBSD</i></li> </ul>
<b>List of Sample Output</b>	<a href="#">show system snapshot on page 173</a>
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request. If there are no snapshots available, the command returns null output.

### Sample Output

#### show system snapshot

```
user@host> show system snapshot
Snapshot snap.20141219.122106:
Location: /packages/sets/snap.20141219.122106
Creation date: Dec 19 12:21:06 2014
Junos version: 15.1-20141216_ib_15_1_psd.0
```

