



Junos[®] OS for EX Series Ethernet Switches

Software Installation on EX Series Switches

Release
12.3



Modified: 2016-09-20

Juniper Networks, Inc.
1133 Innovation Way
Sunnyvale, California 94089
USA
408-745-2000
www.juniper.net

Juniper Networks, Junos, Steel-Belted Radius, NetScreen, and ScreenOS are registered trademarks of Juniper Networks, Inc. in the United States and other countries. The Juniper Networks Logo, the Junos logo, and JunosE are trademarks of Juniper Networks, Inc. All other trademarks, service marks, registered trademarks, or registered service marks are the property of their respective owners.

Juniper Networks assumes no responsibility for any inaccuracies in this document. Juniper Networks reserves the right to change, modify, transfer, or otherwise revise this publication without notice.

Junos[®] OS for EX Series Ethernet Switches Software Installation on EX Series Switches
Release 12.3
Copyright © 2016, Juniper Networks, Inc.
All rights reserved.

The information in this document is current as of the date on the title page.

YEAR 2000 NOTICE

Juniper Networks hardware and software products are Year 2000 compliant. Junos OS has no known time-related limitations through the year 2038. However, the NTP application is known to have some difficulty in the year 2036.

END USER LICENSE AGREEMENT

The Juniper Networks product that is the subject of this technical documentation consists of (or is intended for use with) Juniper Networks software. Use of such software is subject to the terms and conditions of the End User License Agreement ("EULA") posted at <http://www.juniper.net/support/eula.html>. By downloading, installing or using such software, you agree to the terms and conditions of that EULA.

Table of Contents

	About the Documentation	ix
	Documentation and Release Notes	ix
	Supported Platforms	ix
	Using the Examples in This Manual	ix
	Merging a Full Example	x
	Merging a Snippet	x
	Documentation Conventions	xi
	Documentation Feedback	xiii
	Requesting Technical Support	xiii
	Self-Help Online Tools and Resources	xiii
	Opening a Case with JTAC	xiv
Part 1	Overview	
Chapter 1	Installation Overview	3
	Understanding Software Installation on EX Series Switches	3
	Overview of the Software Installation Process	3
	Software Package Security	4
	Installing Software on a Virtual Chassis	4
	Installing Software on Switches with Redundant Routing Engines	4
	Installing Software Using Automatic Software Download	5
	Troubleshooting Software Installation	5
	Understanding System Snapshot on EX Series Switches	5
	Understanding Resilient Dual-Root Partitions on Switches	7
	Resilient Dual-Root Partition Scheme (Junos OS Release 10.4R3 and Later)	7
	Automatic Fixing of Corrupted Primary Root Partition with the Automatic Snapshot Feature	8
	Earlier Partition Scheme (Junos OS Release 10.4R2 and Earlier)	9
	Understanding Upgrading or Downgrading Between Resilient Dual-Root Partition Releases and Earlier Releases	9
	Understanding Zero Touch Provisioning	10
	Junos OS Package Names	12
Chapter 2	Software Overview	15
	Understanding Software Infrastructure and Processes	15
	Routing Engine and Packet Forwarding Engine	15
	Junos OS Processes	16

Chapter 3	Licenses Overview	19
	Understanding Software Licenses for EX Series Switches	19
	Purchasing a Software Feature License	19
	Features Requiring a License on EX2200 Switches	20
	Features Requiring a License on EX3300 Switches	21
	Features Requiring a License on EX3200, EX4200, EX4500, EX4550, EX6200, EX8200, and EX9200 Switches	22
	License Warning Messages	23
Part 2	Installation	
Chapter 4	Software Installation	27
	Downloading Software Packages from Juniper Networks	27
	Installing Software on an EX Series Switch with a Single Routing Engine (CLI Procedure)	28
	Installing Software on an EX Series Switch with Redundant Routing Engines (CLI Procedure)	30
	Preparing the Switch for the Software Installation	31
	Installing Software on the Backup Routing Engine	32
	Installing Software on the Default Master Routing Engine	32
	Returning Routing Control to the Default Master Routing Engine (Optional)	34
	Installing Software on EX Series Switches (J-Web Procedure)	34
	Installing Software Upgrades from a Server	35
	Installing Software Upgrades by Uploading Files	35
	Rebooting or Halting the EX Series Switch (J-Web Procedure)	36
Part 3	Configuration	
Chapter 5	Registering the Switch	41
	Registering the EX Series Switch with the J-Web Interface	41
Chapter 6	Booting the Switch	43
	Booting an EX Series Switch Using a Software Package Stored on a USB Flash Drive	43
	Creating a Snapshot and Using It to Boot an EX Series Switch	44
	Creating a Snapshot on a USB Flash Drive and Using It to Boot the Switch	44
	Creating a Snapshot on an Internal Flash Drive and Using it to Boot the Switch	45
	Creating a Snapshot on the Alternate Slice of the Boot Media	45
Chapter 7	Upgrading Software	47
	Upgrading Software by Using Automatic Software Download	47
	Upgrading the Loader Software on the Line Cards in a Standalone EX8200 Switch or an EX8200 Virtual Chassis	49
	Configuring Zero Touch Provisioning	53

Chapter 8	Managing Licenses	59
	Managing Licenses for the EX Series Switch (CLI Procedure)	59
	Adding New Licenses	59
	Deleting Licenses	60
	Saving License Keys	60
	Managing Licenses for the EX Series Switch (J-Web Procedure)	60
	Adding New Licenses	60
	Deleting Licenses	61
	Displaying License Keys	61
	Downloading Licenses	61
Chapter 9	Configuration Statements	63
	auto-image-upgrade	63
	auto-snapshot	64
Part 4	Administration	
Chapter 10	Routine Monitoring	67
	Verifying That Automatic Software Download Is Working Correctly	67
	Verifying That a System Snapshot Was Created on an EX Series Switch	68
	Verifying Junos OS and Boot Loader Software Versions on an EX Series Switch	68
	Verifying the Number of Partitions and File System Mountings	69
	Verifying the Loader Software Version	70
	Verifying Which Root Partition Is Active	70
	Verifying the Junos OS Version in Each Root Partition	71
Chapter 11	Monitoring Licenses	73
	License Key Components for the EX Series Switch	73
	Monitoring Licenses for the EX Series Switch	73
	Displaying Installed Licenses and License Usage Details	74
	Displaying Installed License Keys	75
Chapter 12	Operational Commands	77
	request system license add	78
	request system license delete	79
	request system license save	80
	request system reboot	81
	request system reboot	86
	request system snapshot	88
	request system software add	94
	request system software delete	102
	request system software rollback	106
	request system software validate	110
	request system zeroize	113
	show system auto-snapshot	118
	show system autoinstallation status	120
	show system boot-messages	122
	show system license	129
	show system snapshot	132

show system storage partitions (EX Series Switches Only)	135
--	-----

Part 5

Chapter 13

Troubleshooting

Troubleshooting Procedures 139

Troubleshooting Software Installation 139

Recovering from a Failed Software Upgrade on an EX Series Switch 139

Rebooting from the Inactive Partition 140

Freeing Disk Space for Software Installation 141

Installation from the Boot Loader Generates 'cannot open package'

Error 141

Troubleshooting a Switch That Has Booted from the Backup Junos OS

Image 142

Resilient Dual-Root Partitions Frequently Asked Questions 143

How Does Upgrading to Junos OS Release 10.4R3 and Later Differ from

Normal Upgrades? 144

What Happens If I Do Not Upgrade Both the Loader Software and Junos OS

at the Same Time? 144

Can I Downgrade Junos OS Without Downgrading the Loader

Software? 145

Can I Upgrade to a Resilient Dual-Root Partition Release by Using the

CLI? 145

Will I Lose My Configuration During an Upgrade? 146

How Long Will the Upgrade Process Take? 146

What Happens to My Files If the System Detects a File System Corruption

and Automatic Snapshot is Enabled? 146

What Happens to My Files If the System Detects a File System Corruption

and Automatic Snapshot is Not Enabled? 147

How Will I Be Informed If My Switch Boots from the Alternate Slice Because

of Corruption in the Root File System? 147

Can I Use Automatic Software Update and Download to Upgrade to a

Resilient Dual-Root Partition Release? 148

Why Is the Message "At least one package installed on this device has

limited support" Displayed When Users Log In to a Switch? 148

Where Can I Find Instructions for Upgrading? 148

List of Tables

	About the Documentation	ix
	Table 1: Notice Icons	xi
	Table 2: Text and Syntax Conventions	xi
Part 1	Overview	
Chapter 1	Installation Overview	3
	Table 3: Resilient Dual-Root Partition Scheme	7
	Table 4: Earlier Partition Scheme	9
Chapter 2	Software Overview	15
	Table 5: Junos OS Processes	16
Chapter 3	Licenses Overview	19
	Table 6: Junos OS EFL Part Number on EX2200 Switches	20
	Table 7: Junos OS EFL Part Number on EX3300 Switches	21
	Table 8: Junos OS AFL Part Number on EX3300 Switches	22
	Table 9: Junos OS AFL Part Number on EX3200, EX4200, EX4500, EX4550, EX6200, EX8200, and EX9200 Switches	23
Part 2	Installation	
Chapter 4	Software Installation	27
	Table 10: Install Remote Summary	35
	Table 11: Upload Package Summary	36
Part 4	Administration	
Chapter 12	Operational Commands	77
	Table 12: show system auto-snapshot status Output Fields	118
	Table 13: show system autoinstallation status Output Fields	120
	Table 14: show system license Output Fields	129
	Table 15: show system snapshot Output Fields	133
	Table 16: show system storage partitions Output Fields	135
Part 5	Troubleshooting	
Chapter 13	Troubleshooting Procedures	139
	Table 17: Combinations of Junos OS Versions and Loader Software Versions	144
	Table 18: Actions If Corrupt Files Are Found and Automatic Snapshot is Enabled	146
	Table 19: Actions If Corrupt Files Are Found	147

About the Documentation

- Documentation and Release Notes on page ix
- Supported Platforms on page ix
- Using the Examples in This Manual on page ix
- Documentation Conventions on page xi
- Documentation Feedback on page xiii
- Requesting Technical Support on page xiii

Documentation and Release Notes

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

If the information in the latest release notes differs from the information in the documentation, follow the product Release Notes.

Juniper Networks Books publishes books by Juniper Networks engineers and subject matter experts. These books go beyond the technical documentation to explore the nuances of network architecture, deployment, and administration. The current list can be viewed at <http://www.juniper.net/books>.

Supported Platforms

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

- EX Series

Using the Examples in This Manual

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
Bold text like this	Represents text that you type.	To enter configuration mode, type the configure command: user@host> configure

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> show chassis alarms No alarms currently active
<i>Italic text like this</i>	<ul style="list-style-type: none">Introduces or emphasizes important new terms.Identifies guide names.Identifies RFC and Internet draft titles.	<ul style="list-style-type: none">A policy <i>term</i> is a named structure that defines match conditions and actions.<i>Junos OS CLI User Guide</i>RFC 1997, <i>BGP Communities Attribute</i>
<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@# set system domain-name <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">To configure a stub area, include the stub statement at the [edit protocols ospf area area-id] hierarchy level.The console port is labeled CONSOLE.
< > (angle brackets)	Encloses optional keywords or variables.	stub <default-metric metric>;
(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.	broadcast multicast (string1 string2 string3)
# (pound sign)	Indicates a comment specified on the same line as the configuration statement to which it applies.	rsvp { # Required for dynamic MPLS only
[] (square brackets)	Encloses a variable for which you can substitute one or more values.	community name members [<i>community-ids</i>]
Indentation and braces ({ })	Identifies a level in the configuration hierarchy.	[edit] routing-options { static { route default { nexthop address; retain; } } }
;(semicolon)	Identifies a leaf statement at a configuration hierarchy level.	
GUI Conventions		
Bold text like this	Represents graphical user interface (GUI) items you click or select.	<ul style="list-style-type: none">In the Logical Interfaces box, select All Interfaces.To cancel the configuration, click Cancel.

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 Protocols>Ospf .

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. 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>.

PART 1

Overview

- [Installation Overview on page 3](#)
- [Software Overview on page 15](#)
- [Licenses Overview on page 19](#)

CHAPTER 1

Installation Overview

- [Understanding Software Installation on EX Series Switches on page 3](#)
- [Understanding System Snapshot on EX Series Switches on page 5](#)
- [Understanding Resilient Dual-Root Partitions on Switches on page 7](#)
- [Understanding Zero Touch Provisioning on page 10](#)
- [Junos OS Package Names on page 12](#)

Understanding Software Installation on EX Series Switches

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 3](#)
- [Software Package Security on page 4](#)
- [Installing Software on a Virtual Chassis on page 4](#)
- [Installing Software on Switches with Redundant Routing Engines on page 4](#)
- [Installing Software Using Automatic Software Download on page 5](#)
- [Troubleshooting Software Installation on page 5](#)

Overview of the Software Installation Process

An EX Series switch is delivered with 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.

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 Switch 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 30](#).

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 Using Automatic Software Download” on page 47](#).

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 139](#).



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 27](#)
- [Installing Software on EX Series Switches \(J-Web Procedure\) on page 34](#)
- [Installing Software on an EX Series Switch with a Single Routing Engine \(CLI Procedure\) on page 28](#)
- [Installing Software on an EX Series Switch with Redundant Routing Engines \(CLI Procedure\) on page 30](#)
- [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 3](#)
- [Creating a Snapshot and Using It to Boot an EX Series Switch on page 44](#)

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 7](#)
- [Automatic Fixing of Corrupted Primary Root Partition with the Automatic Snapshot Feature on page 8](#)
- [Earlier Partition Scheme \(Junos OS Release 10.4R2 and Earlier\) on page 9](#)
- [Understanding Upgrading or Downgrading Between Resilient Dual-Root Partition Releases and Earlier Releases on page 9](#)

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 3 on page 7](#).

Table 3: 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 4 on page 9](#).

Table 4: 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 3 on page 7](#).

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



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.

**Related
Documentation**

- [Resilient Dual-Root Partitions Frequently Asked Questions on page 143](#)
- [EX Series Virtual Chassis Overview](#)
- [EX8200 Virtual Chassis Overview](#)

Understanding Zero Touch Provisioning



NOTE: To see which platforms support Zero Touch Provisioning, 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. Search for that feature name if you want to know if this feature is supported on EX Series switches.

Zero Touch Provisioning 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. To make sure you have the default factory configuration loaded on the switch, issue the **request system zeroize** command on the switch you want to provision.

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 you do not configure the DHCP server to provide this information, the switch boots with the preinstalled software and default factory configuration.

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

- On an EX Series switch, if you downgrade to a software version earlier than Junos OS Release 12.2, in which Zero Touch Provisioning 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 7](#).

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

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, the switch compares the version of the provided configuration file to the version of the configuration file on the switch.

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

If the configuration file version on the FTP, HTTP, or TFTP server is newer than the configuration file on the switch, the configuration file is updated on the switch.

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.

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.

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 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.

**Related
Documentation**

- [Configuring Zero Touch Provisioning on page 53](#)

Junos OS Package Names

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.

A software package name is in the following format:

package-name-m.nZx.y-domestic-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*** is appended to all EX Series package names. For most Junos packages, ***domestic*** is used for the United States and Canada and ***export*** for worldwide distribution. However, for EX Series software, ***domestic*** is used for worldwide distribution as well.

A sample EX Series software package name is:

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

**Related
Documentation**

- [Installing Software on EX Series Switches \(J-Web Procedure\) on page 34](#)
- [Installing Software on an EX Series Switch with a Single Routing Engine \(CLI Procedure\) on page 28](#)

- [Installing Software on an EX Series Switch with Redundant Routing Engines \(CLI Procedure\) on page 30](#)
- [Downloading Software Packages from Juniper Networks on page 27](#)
- [Understanding Software Installation on EX Series Switches on page 3](#)

CHAPTER 2

Software Overview

- [Understanding Software Infrastructure and Processes on page 15](#)

Understanding Software Infrastructure and Processes

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 5 on page 16](#) describes the primary Junos OS processes.

Table 5: 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**
- For more information about processes, see *Junos OS Network Operations Guide*
 - For more information about basic system parameters, supported protocols, and software processes, see *Junos OS System Basics Configuration Guide*

CHAPTER 3

Licenses Overview

- [Understanding Software Licenses for EX Series Switches on page 19](#)

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 19](#)
- [Features Requiring a License on EX2200 Switches on page 20](#)
- [Features Requiring a License on EX3300 Switches on page 21](#)
- [Features Requiring a License on EX3200, EX4200, EX4500, EX4550, EX6200, EX8200, and EX9200 Switches on page 22](#)
- [License Warning Messages on page 23](#)

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 a 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 to use when you purchase the license.

Features Requiring a License on EX2200 Switches

For Juniper Networks EX2200 Ethernet 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 6 on page 20 lists the EFLs that you can purchase for EX2200 switch models. If you have the license, you can run all of the above-mentioned enhanced software features on your EX2200 switch.

Table 6: 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

Table 6: Junos OS EFL Part Number on EX2200 Switches (*continued*)

Switch Model	EFL Part Number
EX2200-48T-4G EX2200-48P-4G	EX-48-EFL

Features Requiring a License on EX3300 Switches

Two types of licenses are available on Juniper Networks EX3300 Ethernet 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)
- Virtual Router
- Virtual Router Redundancy Protocol (VRRP)

[Table 7 on page 21](#) lists the EFLs that you can purchase for EX3300 switch models. If you have the license, you can run all of the above-mentioned enhanced software features on your EX3300 switch.

Table 7: 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:

- BGP/MBGP
- IPv6 routing protocols: IPv6 BGP and IPv6 for MBGP
- Virtual routing and forwarding (VRF) BGP

Table 8 on page 22 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 in order to enable the advanced license features. If you have both these licenses, you can run all of the above-mentioned advanced software features on your EX3300 switch.

Table 8: 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 EX3200, EX4200, EX4500, EX4550, EX6200, EX8200, and EX9200 Switches

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

- Border Gateway Protocol (BGP) and multiprotocol BGP (MBGP)
- 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)

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 9 on page 23 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 above-mentioned advanced software features on your EX3200, EX4200, EX4500, EX4550, EX6200, EX8200, or EX9200 switch.

Table 9: 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
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

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 59](#)
- [Managing Licenses for the EX Series Switch \(J-Web Procedure\) on page 60](#)
- [Monitoring Licenses for the EX Series Switch on page 73](#)
- [License Key Components for the EX Series Switch on page 73](#)
- [EX Series Switch Software Features Overview](#)

PART 2

Installation

- [Software Installation on page 27](#)

CHAPTER 4

Software Installation

- [Downloading Software Packages from Juniper Networks on page 27](#)
- [Installing Software on an EX Series Switch with a Single Routing Engine \(CLI Procedure\) on page 28](#)
- [Installing Software on an EX Series Switch with Redundant Routing Engines \(CLI Procedure\) on page 30](#)
- [Installing Software on EX Series Switches \(J-Web Procedure\) on page 34](#)
- [Rebooting or Halting the EX Series Switch \(J-Web Procedure\) on page 36](#)

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](#)” on page 12.
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 34](#)
- [Installing Software on an EX Series Switch with a Single Routing Engine \(CLI Procedure\) on page 28](#)

- [Understanding Software Installation on EX Series Switches on page 3](#)

[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
- EX3200 switch
- EX3300 switch
- EX4200 switch
- EX4500 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 30](#) 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 27](#).
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.

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.

Related Documentation

- [Installing Software on EX Series Switches \(J-Web Procedure\) on page 34](#)
- [Troubleshooting Software Installation on page 139](#)
- [Junos OS Package Names on page 12](#)
- [Understanding Software Installation on EX Series Switches on page 3](#)

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 28](#).

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 31](#)
2. [Installing Software on the Backup Routing Engine on page 32](#)
3. [Installing Software on the Default Master Routing Engine on page 32](#)
4. [Returning Routing Control to the Default Master Routing Engine \(Optional\) on page 34](#)

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 27.
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 34](#)
- [Upgrading Software on an EX6200 or EX8200 Standalone Switch Using Nonstop Software Upgrade \(CLI Procedure\)](#)
- [Troubleshooting Software Installation on page 139](#)
- [Junos OS Package Names on page 12](#)
- [Understanding Software Installation on EX Series Switches on page 3](#)

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 35](#)
2. [Installing Software Upgrades by Uploading Files on page 35](#)

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 27](#).
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 10 on page 35](#).
5. Click **Fetch and Install Package**. The software is activated after the switch has rebooted.

Table 10: 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: <i>ftp://hostname/pathname/package-name</i> <i>http://hostname/pathname/package-name</i>
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	If this box is checked, the switching platform is automatically rebooted when the upgrade is complete.	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 11 on page 36](#).
4. Click **Upload and Install Package**. The software is activated after the switching platform has rebooted.

Table 11: 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 Browse 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 28](#)
- [Understanding Software Installation on EX Series Switches on page 3](#)
- [Troubleshooting Software Installation on page 139](#)

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*

PART 3

Configuration

- [Registering the Switch on page 41](#)
- [Booting the Switch on page 43](#)
- [Upgrading Software on page 47](#)
- [Managing Licenses on page 59](#)
- [Configuration Statements on page 63](#)

CHAPTER 5

Registering the Switch

- [Registering the EX Series Switch with the J-Web Interface on page 41](#)

Registering the EX Series Switch with the J-Web Interface

You can register your EX Series switch with the J-Web interface so that you can request technical assistance as and when required. To register an EX Series switch:

1. In the J-Web interface, select **Maintain > Customer Support > Product Registration**.
For an EX8200 Virtual Chassis configuration, select the member from the list.
Note the serial number that is displayed.
2. Click **Register**. Enter the serial number in the page that is displayed.

Related Documentation

- [EX Series Switch Software Features Overview](#)

CHAPTER 6

Booting the Switch

- [Booting an EX Series Switch Using a Software Package Stored on a USB Flash Drive on page 43](#)
- [Creating a Snapshot and Using It to Boot an EX Series Switch on page 44](#)

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

There are two methods of getting Junos OS onto 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 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 44](#). 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 the 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 would like to place onto the EX Series switch from the Internet onto the USB flash drive using your computer or other device. See [“Downloading Software Packages from Juniper Networks” on page 27](#).
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 only be performed 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 28](#)
- [Installing Software on EX Series Switches \(J-Web Procedure\) on page 34](#)
- See *Rear Panel of an EX3200 Switch* for USB port location.
- See *Rear Panel of an EX4200 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.
- [Understanding Software Installation on EX Series Switches on page 3](#)

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 44](#)
- [Creating a Snapshot on an Internal Flash Drive and Using it to Boot the Switch on page 45](#)
- [Creating a Snapshot on the Alternate Slice of the Boot Media on page 45](#)

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 external
```

2. (Optional) Perform this step if you want to boot the switch now using the snapshot stored on the USB flash drive. If you created the snapshot as a backup, do not perform this step.

- To reboot the switch using the most recently created snapshot:

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

- To reboot the switch using a snapshot in a specific partition on the USB flash drive:

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

Creating a Snapshot on an Internal Flash Drive and Using it to Boot the Switch

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

To create a snapshot in internal memory and use it to boot the switch:

1. Place the snapshot files in internal memory:

```
user@switch> request system snapshot partition media internal
```

2. (Optional) Perform this step if you want to boot the switch now using the newly created snapshot. If you created the snapshot as a backup, do not perform this step.

- To reboot the switch using the most recently created snapshot:

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

- To reboot the switch using a snapshot in a specific partition in internal memory:

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

Creating a Snapshot on the Alternate Slice of the Boot Media

The alternate slice of the boot media contains a backup software image that the switch can boot from if it is unable to boot from the primary slice. When you upgrade software, the new software image gets copied only to the primary slice of the boot media.

To create a snapshot of the currently booted software image on the backup slice of the boot media:

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

Related Documentation

- [Verifying That a System Snapshot Was Created on an EX Series Switch on page 68](#)
- [Understanding System Snapshot on EX Series Switches on page 5](#)

CHAPTER 7

Upgrading Software

- [Upgrading Software by Using Automatic Software Download on page 47](#)
- [Upgrading the Loader Software on the Line Cards in a Standalone EX8200 Switch or an EX8200 Virtual Chassis on page 49](#)
- [Configuring Zero Touch Provisioning on page 53](#)

Upgrading Software by Using Automatic Software Download

The automatic software download feature uses the Dynamic Host Configuration Protocol (DHCP) message exchange process to download and install software packages. You configure the automatic software download feature on switches that act as DHCP clients. You must enable automatic software download on a switch before the software upgrade can occur.

You configure a path to a software package file on the DHCP server. The server communicates the path to the software package file through DHCP server messages.

If you enable automatic software download, the DHCP client switch compares the software package name in the DHCP server message with the name of the software package that booted the switch. If the software packages are different, the DHCP client switch downloads and installs the software package specified in the DHCP server message.

Before you upgrade software by using automatic software download, ensure that you have configured DHCP services for the switch, including configuring a path to a boot server and a boot file. See *Configuring a DHCP Server on Switches (CLI Procedure)* for information about using the CLI to configure DHCP services and settings. See *Configuring DHCP Services (J-Web Procedure)* for information about using the J-Web interface to configure DHCP services and settings.

To enable automatic software download on an EX Series switch acting as a DHCP client:

```
[edit chassis]
user@switch# set auto-image-upgrade
```

After automatic software download is enabled on your DHCP client switch and after DHCP services are enabled on your network, an automatic software download can occur at any time as part of the DHCP message exchange process.

If an automatic software download occurs, you see the following message on the switch:

Auto-image upgrade started

On successful installation system will reboot automatically

The switch reboots automatically to complete the upgrade.

**Related
Documentation**

- [Verifying That Automatic Software Download Is Working Correctly on page 67](#)
- [Understanding Software Installation on EX Series Switches on page 3](#)
- *Understanding DHCP Services for Switches*

Upgrading the Loader Software on the Line Cards in a Standalone EX8200 Switch or an EX8200 Virtual Chassis

You are almost never required to upgrade the loader software on the line cards in an EX8200 switch.

Upgrading the loader software version for a line card is not a requirement to complete any software upgrade. In rare cases, a line card might go offline immediately after a software upgrade because the loader software version on the line card requires an upgrade to become compatible with the upgraded Junos OS. You can upgrade the loader software on the line cards as a best practice to avoid this problem and other less severe issues.

The loader software on any line card in an EX8200 switch is updated using the same loader software package that upgrades the EX8200 Routing Engine loader software. The line card software loader contains two banks, each with a single loader software version. This procedure is used to upgrade the loader software for both banks of a line card in a standalone EX8200 switch or an EX8200 Virtual Chassis.



NOTE: If you are upgrading Junos OS, the Routing Engine loader software, and the line card loader software, we recommend that you upgrade in this order: Junos OS, line card loader software, Routing Engine loader software.

1. Determine the version of the loader software for the line cards:

```

user@switch> show chassis firmware
Part      Type      Version
FPC 6     U-Boot    U-Boot 1.1.6 (Jan 13 2009 - 06:55:22) 2.3.0
          loader  FreeBSD/PowerPC U-Boot bootstrap loader 2.2
FPC 7     U-Boot    U-Boot 1.1.6 (Jan 13 2009 - 06:55:22) 2.3.0
          loader  FreeBSD/PowerPC U-Boot bootstrap loader 2.2
Routing Engine 0 U-Boot    U-Boot 1.1.6 (Mar 11 2011 - 04:29:01) 3.5.0
          loader  FreeBSD/PowerPC U-Boot bootstrap loader 2.4
Routing Engine 1 U-Boot    U-Boot 1.1.6 (Mar 11 2011 - 04:29:01) 2.3.0
          loader  FreeBSD/PowerPC U-Boot bootstrap loader 2.4

```



NOTE: On an EX8200 Virtual Chassis, you cannot execute the `show chassis firmware` command on the master external Routing Engine. You must execute this command on each member switch:

1. From the master external Routing Engine, start a shell session on the member switch. For example:

```
user@external-routing-engine> request session member 0
```

2. Enter the CLI and execute the `show chassis firmware` command.
3. Repeat these steps for the other member switch.

The loader software version appears after the timestamp for **U-Boot 1.1.6**. In the preceding example, the version is **2.3.0**. Ignore the U-Boot version number (1.1.6); it has nothing to do with the loader software version that you need to determine.

If the loader software version is earlier than **3.5.0** for any **FPC**, you should consider upgrading the loader software for that line card.

2. Download the loader software package from the Juniper Networks website and place the software package on an internal software distribution site or in a local directory on the switch. We recommend using `/var/tmp` as the local directory on the switch.



NOTE: To obtain the loader software package, see the Download Software page at <http://www.juniper.net/support/downloads/junos.html>. Click on the version, then the Software tab, and then the name of the software install package. In the pop-up Alert box, click the link to the PSN document.

3. Disable graceful Routing Engine switchover (GRES) and nonstop active routing (NSR), if enabled. Commit the configuration:

```

user@switch# deactivate chassis redundancy graceful-switchover
user@switch# deactivate routing-options nonstop-routing
user@switch# commit synchronize

```

4. Install the loader package:

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

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

- For a software package in the `/var/tmp` directory on the switch or external Routing Engine—`/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, `jloader-ex-8200-11.3build-signed.tgz`.

5. Upgrade the loader software.

- To upgrade the loader software for a line card on a standalone EX8200 switch:

```
user@switch> request system firmware upgrade fpc slot slot-number
Firmware upgrade initiated....
Please wait for ~2mins for upgrade to complete....
```

- To upgrade the loader software for a line card on an EX8200 member switch in an EX8200 Virtual Chassis:

```
user@switch> request system firmware upgrade fpc slot slot-number member member-id

Firmware upgrade initiated....
Please wait for ~2mins for upgrade to complete....
```

6. Confirm the loader software upgrade:

```
user@switch> show system firmware
```

Part	Type	Tag	Current version	Available version	Status
FPC 6	U-Boot	0	2.3.0		UPGRADED SUCCESSFULLY
FPC 7	U-Boot	0	2.3.0		OK
Routing Engine 0	RE BIOS	0	3.1.1		OK
Routing Engine 1		0	3.1.1		OK

The status is **UPGRADED SUCCESSFULLY** if the boot loader version update process is complete.

The status is **PROGRAMMING** if the boot loader version update process is still in progress.

Do not proceed to the next step until the **show system firmware** output confirms that the loader software upgrade is complete.

7. Restart the line card.

- To restart a line card on a standalone EX8200 switch:

```
user@switch> request chassis fpc restart slot slot-number
```

- To restart a line card on an EX8200 member switch in an EX8200 Virtual Chassis:

```
user@switch> request chassis fpc restart slot slot-number member member-id
```



NOTE: You can monitor the status of the line card restart by using the **show chassis fpc** command.

8. After the line card restart has completed, confirm the loader software version update:

```
user@switch> show chassis firmware
```

Part	Type	Tag	Current version	Available version	Status
FPC 6	U-Boot	0	3.5.0		OK
FPC 7	U-Boot	0	2.3.0		OK
Routing Engine 0 RE BIOS		0	3.1.1		OK
Routing Engine 1		0	3.1.1		OK

The current version has updated to **3.5.0**. You have upgraded the loader software for one bank of the line card.

- Repeat Steps 4 through 7 to upgrade the loader software on the other bank of the line card.



NOTE: A bank switchover occurs automatically as part of the line card restart. Repeating Steps 3 through 6 updates the loader software on the other bank.

- Repeat Steps 4 through 8 for all other line cards that require a line card loader version upgrade.

Related Documentation

- *Upgrading Software on an EX6200 or EX8200 Standalone Switch Using Nonstop Software Upgrade (CLI Procedure)*
- *Upgrading Software on an EX8200 Virtual Chassis Using Nonstop Software Upgrade (CLI Procedure)*
- *Troubleshooting an EX8200 Line Card's Failure to Power On*

Configuring Zero Touch Provisioning



NOTE: To see which platforms support Zero Touch Provisioning, 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. Search for that feature name if you want to know if this feature is supported on EX Series switches.

Zero Touch Provisioning allows you to provision new switches in your network automatically, without manual intervention. When you physically connect a switch 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 switch uses information that you configure on a Dynamic Host Control Protocol (DHCP) server to determine whether to perform these actions and to locate the necessary software image and configuration files on the network. If you do not configure the DHCP server to provide this information, the switch boots with the preinstalled software and default configuration.



NOTE: If you have both DHCP and ZTP enabled, the switch broadcasts a DHCP DISCOVER packet every six minutes. If a DHCP server on the network responds with a DHCP ACK packet with DHCP vendor options set with the necessary values to initiate ZTP, then ZTP proceeds.

To disable broadcasting the DHCP DISCOVER packet every six minutes, without performing the ZTP process, manually delete the `auto-image-upgrade` statement located in the `[edit chassis]` hierarchy. If ZTP completes without errors, the `auto-image-upgrade` statement is automatically deleted.



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). 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>.

Before you begin:

- Ensure that the switch has access to the following network resources:

- The DHCP server provides the location of the software image 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.



CAUTION: HTTP URLs are limited to 256 characters in length.

- 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
- Locate and record the MAC address printed on the switch chassis.



CAUTION: You cannot commit a configuration while the switch is performing the software update process. If you commit a configuration while the switch is performing the configuration file autoinstallation process, the process stops, and the configuration file is not downloaded from the network.

To configure Zero Touch Provisioning for a switch:

1. Make sure the switch has the default factory configuration installed.
Issue the **request system zeroize** command on the switch that you want to provision.
2. Download the software image file and the configuration file to the FTP, HTTP, TFTP, server that the switch will download these files from.
You can download either one or both of these files.
3. Configure the DHCP server to provide the necessary information to the switch.



NOTE: When you configure a value for any of the DHCP options, the value cannot exceed 256 bytes.

Configure IP address assignment.

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

4. 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.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;
```

5. 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-4200-13.2R1.1-domestic-signed.tgz";
```

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

```
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 switch 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.

```
option NEW_OP.alt-image-file-name
"/dist/images/jinstall-ex-4200-13.2R1.1-domestic-signed.tgz";
```

6.



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";
```

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

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

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

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

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

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

10. (Optional) Configure DHCP option 12 to specify the hostname of the switch.

```
option hostname "jn-switch35";
```

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

```
host jn-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 "jn-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-4200-13.2R1.1-domestic-signed.tgz";
  option NEW_OP.transfer-mode "ftp";
  option NEW_OP.config-file-name "/dist/config/jn-switch35.config";
}
```

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

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

11. Connect the switch to the network that includes the DHCP server and the FTP, HTTP, or TFTP,server.

12. Boot the switch with the default configuration.
13. Monitor the ZTP process by looking at the following log files.



NOTE: When SLAX scripts are issued, the `op-script.log` and `event-script.log` files are produced.

- `/var/log/dhcp_logfile`
- `/var/log/image_load_log`
- `/var/log/op-script.log`
- `/var/log/event-script.log`

**Related
Documentation**

- [Understanding Zero Touch Provisioning on page 10](#)
- *NTP Time Server and Time Services Overview*
- *Op Script Overview*
- *Understanding DHCP Services for Switches*
- *Reverting to the Default Factory Configuration by Using the `request system zeroize` Command*

CHAPTER 8

Managing Licenses

- [Managing Licenses for the EX Series Switch \(CLI Procedure\) on page 59](#)
- [Managing Licenses for the EX Series Switch \(J-Web Procedure\) on page 60](#)

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 73](#).

This topic includes the following tasks:

- [Adding New Licenses on page 59](#)
- [Deleting Licenses on page 60](#)
- [Saving License Keys on page 60](#)

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 60](#)
- [Monitoring Licenses for the EX Series Switch on page 73](#)
- [Understanding Software Licenses for EX Series Switches on page 19](#)

Managing Licenses for the EX Series Switch (J-Web 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 73](#).

This topic includes the following tasks:

- [Adding New Licenses on page 60](#)
- [Deleting Licenses on page 61](#)
- [Displaying License Keys on page 61](#)
- [Downloading Licenses on page 61](#)

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 59](#)
- [Monitoring Licenses for the EX Series Switch on page 73](#)
- [Understanding Software Licenses for EX Series Switches on page 19](#)

CHAPTER 9


Configuration Statements

- [auto-image-upgrade on page 63](#)
- [auto-snapshot on page 64](#)

auto-image-upgrade

Syntax	auto-image-upgrade;
Hierarchy Level	[edit chassis]
Release Information	Statement introduced in Junos OS Release 9.6 for EX Series switches.
Description	<p>Enable automatic software download on an EX Series switch acting as a DHCP client.</p> <p>The DHCP client EX Series switch compares the software package name in the DHCP server message to the name of the software package that booted the switch. If the software packages are different, the DHCP client EX Series switch downloads and installs the software package specified in the DHCP server message.</p> <p>Before you upgrade software using automatic software download, ensure that you have configured DHCP services for the switch, including configuring a path to a boot server and a boot file. See the Junos OS System Basics Configuration Guide for information about using the CLI to configure DHCP services and settings. See <i>Configuring DHCP Services (J-Web Procedure)</i> for information about using the J-Web interface to configure DHCP services and settings.</p>
Default	Automatic software download is disabled.
Required Privilege Level	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Upgrading Software Using Automatic Software Download on page 47• Understanding Software Installation on EX Series Switches on page 3• <i>Understanding DHCP Services for Switches</i>

auto-snapshot

Syntax	auto-snapshot;
Hierarchy Level	[edit system]
Release Information	Statement introduced in Junos OS Release 12.3 for EX Series switches.
Description	Enable 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.
<div> NOTE: EX9200 switches do not support the automatic snapshot feature.</div>	
Default	<ul style="list-style-type: none">• The automatic snapshot feature is enabled by default on the following EX Series switches:<ul style="list-style-type: none">• 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.
Required Privilege Level	system—To view this statement in the configuration. system-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Understanding Resilient Dual-Root Partitions on Switches on page 7• show system auto-snapshot on page 118

PART 4

Administration

- [Routine Monitoring on page 67](#)
- [Monitoring Licenses on page 73](#)
- [Operational Commands on page 77](#)

CHAPTER 10

Routine Monitoring

- [Verifying That Automatic Software Download Is Working Correctly on page 67](#)
- [Verifying That a System Snapshot Was Created on an EX Series Switch on page 68](#)
- [Verifying Junos OS and Boot Loader Software Versions on an EX Series Switch on page 68](#)

Verifying That Automatic Software Download Is Working Correctly

Purpose Verify that the automatic software download feature is working correctly.

Action Use the `show system services dhcp client interface-name` command to verify that the automatic software download feature has been used to install a software package.

```
user@switch> show system services dhcp client ge-0/0/1.0
Logical Interface Name      ge-0/0/1.0
Hardware address           00:0a:12:00:12:12
Client Status              bound
Vendor Identifier          ether
Server Address             10.1.1.1
Address obtained           10.1.1.89
Lease Obtained at          2009-08-20 18:13:04 PST
Lease Expires at           2009-08-22 18:13:04 PST

DHCP Options :
Name: name-server, Value: [ 10.209.194.131, 2.2.2.2, 3.3.3.3 ]
Name: server-identifier, Value: 10.1.1.1
Name: router, Value: [ 10.1.1.80 ]
Name: boot-image,
Value: jinstall-ex-4200-9.6R1.5-domestic-signed.tgz
Name: boot-image-location,
Value: 10.1.1.25:/bootfiles/
```

Meaning The output from this command shows the name and location of the software package under DHCP options when automatic software download was last used to install a software package. The sample output in DHCP options shows that the last DHCP server message to arrive on the DHCP client had a boot server address of 192.168.1.165 and a boot file named jinstall-ex-4200-9.6R1.5-domestic-signed.tgz. If automatic software download was enabled on this client switch during the last DHCP message exchange, these values were used by the switch to upgrade the software.

- Related Documentation**
- [Upgrading Software Using Automatic Software Download on page 47](#)
 - [Understanding DHCP Services for Switches](#)

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/da1s1a) (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/da1s2a) (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 44](#)

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 69](#)
- [Verifying the Loader Software Version on page 70](#)

- [Verifying Which Root Partition Is Active on page 70](#)
- [Verifying the Junos OS Version in Each Root Partition on page 71](#)

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 139](#)
 - [Troubleshooting a Switch That Has Booted from the Backup Junos OS Image on page 142](#)
 - [Understanding Resilient Dual-Root Partitions on Switches on page 7](#)
 - [Resilient Dual-Root Partitions Frequently Asked Questions on page 143](#)

CHAPTER 11

Monitoring Licenses

- [License Key Components for the EX Series Switch on page 73](#)
- [Monitoring Licenses for the EX Series Switch on page 73](#)

License Key Components for the EX Series Switch

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 59](#)
- [Managing Licenses for the EX Series Switch \(J-Web Procedure\) on page 60](#)
- [Understanding Software Licenses for EX Series Switches on page 19](#)

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 74](#)
- [Displaying Installed License Keys on page 75](#)

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 stuvwx 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 59](#)
- [Managing Licenses for the EX Series Switch \(J-Web Procedure\) on page 60](#)
- [Understanding Software Licenses for EX Series Switches on page 19](#)

CHAPTER 12

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 software add
- request system software delete
- request system software rollback
- request system software validate
- request system zeroize
- show system auto-snapshot
- show system autoinstallation status
- show system boot-messages
- show system license
- show system snapshot
- show system storage partitions (EX Series Switches Only)

request system license add

Syntax	<code>request system license add (<i>filename</i> terminal)</code>
Release Information	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.
Description	Add a license key.
Options	<i>filename</i> —License key from a file or URL. Specify the filename or the URL where the key is located. <i>terminal</i> —License key from the terminal.
Required Privilege Level	maintenance
Related Documentation	<ul style="list-style-type: none">• <i>Adding New Licenses (CLI Procedure)</i>
List of Sample Output	request system license add on page 78
Output Fields	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
```

request system license delete

List of Syntax	Syntax on page 79 Syntax (QFX Series) on page 79
Syntax	request system license delete <i>license-id</i>
Syntax (QFX Series)	request system license delete <i>license-identifier</i>
Release Information	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.
Description	Delete a license key. You can delete only one license at a time.
Options	<i>license-id</i> —License ID that uniquely identifies a license key. <i>license-identification</i> —(QFX Series) License ID that uniquely identifies a license key.
Required Privilege Level	maintenance
Related Documentation	<ul style="list-style-type: none"> • Deleting a License (CLI Procedure)
List of Sample Output	request system license delete on page 79
Output Fields	When you enter this command, you are provided feedback on the status of your request.

Sample Output

request system license delete

```
user@host> request system license delete G03000002223
```

request system license save

Syntax	<code>request system license save (<i>filename</i> terminal)</code>
Release Information	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.
Description	Save installed license keys to a file or URL.
Options	<i>filename</i> —License key from a file or URL. Specify the filename or the URL where the key is located. <i>terminal</i> —License key from the terminal.
Required Privilege Level	maintenance
Related Documentation	<ul style="list-style-type: none">• <i>Saving License Keys</i>
List of Sample Output	request system license save on page 80
Output Fields	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

List of Syntax	Syntax on page 81 Syntax (EX Series Switches) on page 81 Syntax (TX Matrix Router) on page 81 Syntax (TX Matrix Plus Router) on page 81 Syntax (MX Series Router) on page 81
Syntax	<pre>request system reboot <at <i>time</i>> <both-routing-engines> <in <i>minutes</i>> <media (compact-flash disk removable-compact-flash usb)> <message "<i>text</i>"> <other-routing-engine></pre>
Syntax (EX Series Switches)	<pre>request system reboot <all-members> <at <i>time</i>> <both-routing-engines> <in <i>minutes</i>> <local> <media (external internal)> <member <i>member-id</i>> <message "<i>text</i>"> <other-routing-engine> <slice <i>slice</i>></pre>
Syntax (TX Matrix Router)	<pre>request system reboot <all-chassis all-lcc lcc <i>number</i> scc> <at <i>time</i>> <both-routing-engines> <in <i>minutes</i>> <media (compact-flash disk)> <message "<i>text</i>"> <other-routing-engine></pre>
Syntax (TX Matrix Plus Router)	<pre>request system reboot <all-chassis all-lcc lcc <i>number</i> sfc <i>number</i>> <at <i>time</i>> <both-routing-engines> <in <i>minutes</i>> <media (compact-flash disk)> <message "<i>text</i>"> <other-routing-engine> <partition (1 2 alternate)></pre>
Syntax (MX Series Router)	<pre>request system reboot <all-members> <at <i>time</i>> <both-routing-engines> <in <i>minutes</i>> <local></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 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 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 and TX Matrix Plus routers only) (Optional) On a TX Matrix router or TX Matrix Plus router, the number of a specified line card chassis connected to the TX Matrix or TX Matrix Plus router, respectively. Replace ***number*** with a value from 0 through 3.

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

media (compact-flash | disk | removable-compact-flash | usb)—(Optional) Boot medium for next boot. (The options **removable-compact-flash** and **usb** pertain to the J Series routers only.)

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	<ul style="list-style-type: none">• <i>clear system reboot</i>• <i>request system halt</i>• <i>request system reboot</i>• <i>Rebooting and Halting a QFX Series Product</i>
List of Sample Output	request system reboot on page 84 request system reboot (at 2300) on page 85 request system reboot (in 2 Hours) on page 85 request system reboot (Immediately) on page 85 request system reboot (at 1:20 AM) on page 85
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

Syntax	<pre>request system reboot <all-members local member member-id> <at time> <in minutes> <media (external internal)> <message "text"> <slice (1 2 alternate)></pre>
Release Information	Command introduced in Junos OS Release 9.0 for EX Series switches. Option partition changed to slice in Junos OS Release 10.0 for EX Series switches.
Description	<p>Reboot the Junos OS.</p> <p>Reboot requests are recorded in the system log files, which you can view with the show log command. You can view the process names with the show system processes command.</p>
Options	<p>none—Reboots the software immediately.</p> <p>all-members local member member-id—(EX4200 switch only) (Optional) Specify which member of the Virtual Chassis to reboot:</p> <ul style="list-style-type: none">• all-members—Reboots each switch that is a member of the Virtual Chassis.• local—Reboots the local switch, meaning the switch you are logged into, only.• member member-id—Reboots the specified member switch of the Virtual Chassis. <p>at time—(Optional) Time at which to reboot the software, specified in one of the following ways:</p> <ul style="list-style-type: none">• +minutes—Number of minutes from now to reboot the software.• hh:mm—Absolute time on the current day at which to reboot the software, specified in 24-hour time.• now—Stop or reboot the software immediately. This is the default.• yymmddhhmm—Absolute time at which to reboot the software, specified as year, month, day, hour, and minute. <p>in minutes—(Optional) Number of minutes from now to reboot the software. This option is an alias for the at +minutes option.</p> <p>media (external internal)—(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>message "text"—(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

List of Syntax	Syntax on page 88 Syntax (ACX Series Routers) on page 88 Syntax (EX Series Switches) on page 88 Syntax (MX Series Routers) on page 88 Syntax (TX Matrix Routers) on page 88 Syntax (TX Matrix Plus Routers) on page 88
Syntax	<code>request system snapshot</code> <code><partition></code>
Syntax (ACX Series Routers)	<code>request system snapshot</code> <code><media type></code> <code><partition></code>
Syntax (EX Series Switches)	<code>request system snapshot</code> <code><all-members local member <i>member-id</i>></code> <code><media type></code> <code><partition></code> <code><re0 re1 routing-engine <i>routing-engine-id</i>></code> <code><slice alternate></code>
Syntax (MX Series Routers)	<code>request system snapshot</code> <code><all-members></code> <code><config-partition></code> <code><local></code> <code><member <i>member-id</i>></code> <code><media <i>usb-port-number</i>></code> <code><partition></code> <code><root-partition></code>
Syntax (TX Matrix Routers)	<code>request system snapshot</code> <code><all-chassis all-lcc lcc <i>number</i> scc></code> <code><config-partition></code> <code><partition></code> <code><root-partition></code>
Syntax (TX Matrix Plus Routers)	<code>request system snapshot</code> <code><all-chassis all-lcc lcc <i>number</i> sfc <i>number</i>></code> <code><config-partition></code> <code><partition></code> <code><root-partition></code>
Release Information	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><config-partition></code> and <code><root-partition></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.

- 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 7.](#)

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.

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 System Basics Configuration Guide*.

(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.

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.

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 System Basics Configuration Guide*.
- (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

- [show system snapshot on page 132](#)
- [show system auto-snapshot on page 118](#)

List of Sample Output

- [request system snapshot \(Routers\) on page 92](#)
- [request system snapshot \(EX Series Switches\) on page 92](#)
- [request system snapshot \(When the Partition Flag Is On\) on page 92](#)
- [request system snapshot \(MX104 routers when media device is missing\) on page 93](#)
- [request system snapshot \(When Mirroring Is Enabled\) on page 93](#)
- [request system snapshot all-lcc \(Routing Matrix\) on page 93](#)
- [request system snapshot all-members \(Virtual Chassis\) on page 93](#)

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 software add

List of Syntax	Syntax on page 94 Syntax (EX Series Switches) on page 94 Syntax (TX Matrix Router) on page 94 Syntax (TX Matrix Plus Router) on page 94 Syntax (MX Series Router) on page 95 Syntax (QFX Series) on page 95
Syntax	<code>request system software add <i>package-name</i></code> <code><best-effort-load></code> <code><delay-restart></code> <code><force></code> <code><no-copy></code> <code><no-validate></code> <code><re0 re1></code> <code><reboot></code> <code><set [<i>package-name package-name</i>]></code> <code><unlink></code> <code><upgrade-with-config></code> <code><upgrade-with-config-format <i>format</i>></code> <code><validate></code>
Syntax (EX Series Switches)	<code>request system software add <i>package-name</i></code> <code><best-effort-load></code> <code><delay-restart></code> <code><force></code> <code><no-copy></code> <code><no-validate></code> <code><re0 re1></code> <code><reboot></code> <code><set [<i>package-name package-name</i>]></code> <code><upgrade-with-config></code> <code><upgrade-with-config-format <i>format</i>></code> <code><validate></code>
Syntax (TX Matrix Router)	<code>request system software add <i>package-name</i></code> <code><best-effort-load></code> <code><delay-restart></code> <code><force></code> <code><lcc <i>number</i> scc></code> <code><no-copy></code> <code><no-validate></code> <code><re0 re1></code> <code><reboot></code> <code><set [<i>package-name package-name</i>]></code> <code><unlink></code> <code><upgrade-with-config></code> <code><upgrade-with-config-format <i>format</i>></code> <code><validate></code>
Syntax (TX Matrix Plus Router)	<code>request system software add <i>package-name</i></code> <code><best-effort-load></code>

```

<delay-restart>
<force>
<lcc number | sfc number>
<no-copy>
<no-validate>
<re0 | re1>
<reboot>
<set [package-name package-name]>
<unlink>
<upgrade-with-config>
<upgrade-with-config-format format>
<validate>

```

Syntax (MX Series Router) request system software add *package-name*

```

<best-effort-load>
<delay-restart>
<force>
<member member-id>
<no-copy>
<no-validate>
<re0 | re1>
<reboot>
<set [package-name package-name]>
<unlink>
<upgrade-with-config>
<upgrade-with-config-format format>
<validate>

```

Syntax (QFX Series) request system software add *package-name*

```

<best-effort-load>
<component all>
<delay-restart>
<force>
<no-copy>
<no-validate>
<partition>
<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.

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.

- 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`
- On a J Series Services Router, when you install the software from a remote location, the package is removed at the earliest opportunity in order to make room for the installation to be completed. If you copy the software to a local directory on the router and then install the new package, use the `unlink` option to achieve the same effect and allow the installation to be completed.

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.

force—(Optional) Force the addition of the software package or bundle (ignore warnings).

lcc number—(TX Matrix 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 (or line-card chassis) 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 T1600 router (or line-card chassis) that is connected to the TX Matrix Plus router. Replace *number* with a value from 0 through 3.

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.

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 (or switch-fabric chassis). 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 J Series Services Routers, this option ensures that the software package is removed at the earliest opportunity in order to make room for the installation to be completed. 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-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 `request system software add validate` command is not supported on EX Series switches except for EX9200 switches.

Additional Information



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.

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.

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 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 backup Routing Engines that are connected to it are upgraded to the same version of software.

Required Privilege Level	maintenance
Related Documentation	<ul style="list-style-type: none">• request system software delete on page 102• request system software rollback on page 106• <i>request system storage cleanup</i>• <i>Upgrading Software on QFX3500 and QFX3600 Standalone Switches</i>• <i>Upgrading Software on a QFabric System</i>• <i>request system software add (Maintenance)</i>
List of Sample Output	request system software add validate on page 100 request system software add (Mixed EX4200 and EX4500 Virtual Chassis) on page 101 request system software add component all (QFabric Systems) on page 101
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 delete

List of Syntax	Syntax on page 102 Syntax (TX Matrix Router) on page 102 Syntax (TX Matrix Plus Router) on page 102
Syntax	<code>request system software delete <i>software-package</i></code> <code><force></code> <code><reboot></code> <code><set [<i>package-name package-name</i>]></code>
Syntax (TX Matrix Router)	<code>request system software delete <i>software-package</i></code> <code><force></code> <code><lcc <i>number</i> scc></code> <code><reboot></code> <code><set [<i>package-name package-name</i>]></code>
Syntax (TX Matrix Plus Router)	<code>request system software delete <i>software-package</i></code> <code><force></code> <code><lcc <i>number</i> sfc <i>number</i>></code> <code><reboot></code> <code><set [<i>package-name package-name</i>]></code>
Release Information	Command introduced before Junos OS Release 7.4. 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. Command introduced in Junos OS Release 11.1 for the QFX Series. Option set [<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. Option reboot introduced in Junos OS Release 12.3.
Description	Remove a software package or bundle from the router or switch.
<div>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.</div>	
Options	<i>software-package</i> —Software package or bundle name. You can delete any or all of the following software bundles or packages: <ul style="list-style-type: none">• jbase—(Optional) Junos base software suite• jcrypto—(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 and TX Matrix Plus routers only) (Optional) On a TX Matrix router, remove an extension or upgrade package from a specific T640 router (or line-card chassis) that is connected to the TX Matrix router. On a TX Matrix Plus router, remove an extension or upgrade package from a specific T1600 router (or line-card chassis) that is connected to the TX Matrix Plus router. Replace **number** with a value from 0 through 3.

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 (or switch-fabric chassis). Replace **number** with 0.

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 94](#)
- [request system software rollback on page 106](#)

- [request system software validate on page 110](#)

List of Sample Output [request system software delete jdocs on page 104](#)

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

List of Syntax	Syntax on page 106 Syntax (EX Series Switches) on page 106 Syntax (TX Matrix Router) on page 106 Syntax (TX Matrix Plus Router) on page 106 Syntax (MX Series Router) on page 106
Syntax	request system software rollback
Syntax (EX Series Switches)	request system software rollback <all-members> <local> <member <i>member-id</i> > <reboot>
Syntax (TX Matrix Router)	request system software rollback <lcc <i>number</i> scc> <reboot>
Syntax (TX Matrix Plus Router)	request system software rollback <lcc <i>number</i> sfc <i>number</i> > <reboot>
Syntax (MX Series Router)	request system software rollback <all-members> <local> <member <i>member-id</i> > <reboot>
Release Information	Command introduced before Junos OS Release 7.4. 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. Command introduced in Junos OS Release 11.1 for the QFX Series. Command behavior changed in Junos OS Release 12.1. Option reboot introduced in Junos OS Release 12.3.
Description	<p>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.</p> <p>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.</p> <p>A software rollback fails if any required package (or a bundle package containing the required package) cannot be found in <code>/var/sw/pkg</code>.</p> <p><i>Additional Information</i></p>

- 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. Rollback takes each root back to the previously installed image.

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.

lcc number—(TX Matrix 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 (or line-card chassis) connected to the TX Matrix router. On a TX Matrix Plus router, attempt to roll back to the previous set of packages on a T1600 router (or line-card chassis) connected to the TX Matrix Plus router. Replace **number** with a value from 0 through 3.

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.

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 (or switch-fabric chassis). Replace **number** with 0.

Required Privilege Level maintenance

- Related Documentation**
- *request system software abort*
 - [request system software add on page 94](#)
 - [request system software delete on page 102](#)
 - [request system software validate on page 110](#)
 - *request system configuration rescue delete*
 - *request system configuration rescue save*

List of Sample Output [request system software rollback on page 109](#)

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

List of Syntax	Syntax on page 110 Syntax (TX Matrix Router) on page 110 Syntax (TX Matrix Plus Router) on page 110 Syntax (MX Series Router) on page 110
Syntax	<pre>request system software validate <i>package-name</i> <set [<i>package-name package-name</i>]> <upgrade-with-config> <upgrade-with-config-format <i>format</i>></pre>
Syntax (TX Matrix Router)	<pre>request system software validate <i>package-name</i> <lcc <i>number</i> scc> <set [<i>package-name package-name</i>]> <upgrade-with-config> <upgrade-with-config-format <i>format</i>></pre>
Syntax (TX Matrix Plus Router)	<pre>request system software validate <i>package-name</i> <lcc <i>number</i> sfc <i>number</i>> <set [<i>package-name package-name</i>]> <upgrade-with-config> <upgrade-with-config-format <i>format</i>></pre>
Syntax (MX Series Router)	<pre>request system software validate <i>package-name</i> <member <i>member-id</i>> <set [<i>package-name package-name</i>]> <upgrade-with-config> <upgrade-with-config-format <i>format</i>></pre>
Release Information	<p>Command introduced before Junos OS Release 7.4.</p> <p>sfc 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>set [<i>package-name package-name</i>] option added in Junos OS Release 12.2 for M Series, MX Series, T Series routers, and Branch SRX Series Services Gateways.</p> <p>upgrade-with-config and upgrade-with-config-format <i>format</i> options added in Junos OS Release 12.3 for M Series routers, MX Series routers, and T Series routers.</p>
Description	Validate candidate software against the current configuration of the router.
Options	<p>lcc <i>number</i>—(TX Matrix 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 on a specific T1600 router (or line-card chassis) that is connected to the TX Matrix Plus router. Replace <i>number</i> with a value from 0 through 3.</p> <p>member <i>member-id</i>—(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 <i>member-id</i> with a value of 0 or 1.</p>

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 (or switch-fabric chassis).

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 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 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 abort](#)
- [request system software add on page 94](#)
- [request system software delete on page 102](#)
- [request system software rollback on page 106](#)

List of Sample Output [request system software validate \(Successful Case\) on page 112](#)
 [request system software validate \(Failure Case\) on page 112](#)

Output Fields 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
```

request system zeroize

Syntax	request system zeroize <media>
Release Information	<p>Command introduced before Junos OS Release 9.0.</p> <p>Command introduced in Junos OS Release 11.2 for EX Series switches.</p> <p>Option media added in Junos OS Release 11.4 for EX Series switches.</p> <p>Command introduced in Junos OS Release 12.2 for MX Series devices.</p> <p>Command introduced in Junos OS Release 12.3 for the QFX Series.</p>
Description	<div>  <p>NOTE: The media option is not available on the QFX Series.</p> </div> <p>Remove all configuration information on the Routing Engines and reset all key values. If the device has dual Routing Engines, the command is broadcast to all Routing Engines on the device. The command removes all data files, including customized configuration and log files, by unlinking the files from their directories. The command removes all user-created files from the system including all plain-text passwords, secrets, and private keys for SSH, local encryption, local authentication, IPsec, RADIUS, TACACS+, and SNMP.</p> <p>This command reboots the device and sets it to the factory default configuration. After the reboot, you cannot access the device through the management Ethernet interface. Log in through the console as root and start the Junos OS command-line interface (CLI) by typing cli at the prompt.</p> <p>To completely erase user-created data so that it is unrecoverable, use the media option.</p>
Options	<p>media—(Optional) In addition to removing all configuration and log files, the media option causes memory and the media to be scrubbed, removing all traces of any user-created files. Every storage device attached to the system is scrubbed, including disks, flash drives, removable USBs, and the like. The duration of the scrubbing process is dependent on the size of the media being erased. As a result, the request system zeroize media operation can take considerably more time than the request system zeroize operation. However, the critical security parameters are all removed at the beginning of the process.</p>
Required Privilege Level	maintenance
Related Documentation	<ul style="list-style-type: none"> • request system snapshot on page 88 • <i>request system snapshot</i> • <i>Reverting to the Default Factory Configuration for the EX Series Switch</i> • <i>Reverting to the Rescue Configuration for the EX Series Switch</i> • <i>Reverting to the Default Factory Configuration</i>

- *Reverting to the Rescue Configuration*
- *Reverting to the Default Factory Configuration by Using the request system zeroize Command*

List of Sample Output [request system zeroize on page 114](#)
 [request system zeroize media on page 115](#)

Sample Output

request system zeroize

```
user@host> request system zeroize
warning: System will be rebooted and may not boot without configuration
Erase all data, including configuration and log files? [yes,no] (no) yes

0 1 1 0 0 0 done

syncing disks... All buffers synced.
Uptime: 5d19h20m26s
recorded reboot as normal shutdown
Rebooting...

U-Boot 1.1.6 (Mar 11 2011 - 04:39:06)

Board: EX4200-24T 2.11
EPLD: Version 6.0 (0x85)
DRAM: Initializing (1024 MB)
FLASH: 8 MB

Firmware Version: --- 01.00.00 ---
USB: scanning bus for devices... 2 USB Device(s) found
      scanning bus for storage devices... 1 Storage Device(s) found

ELF file is 32 bit
Consoles: U-Boot console

FreeBSD/PowerPC U-Boot bootstrap loader, Revision 2.4
(user@juniper.net, Fri Mar 11 03:03:36 UTC 2011)
Memory: 1024MB
bootsequencing is enabled
bootsuccess is set
new boot device = disk0s1:
Loading /boot/defaults/loader.conf
/kernel data=0x915c84+0xa1260 syms=[0x4+0x7cbd0+0x4+0xb1c19]

Hit [Enter] to boot immediately, or space bar for command prompt.
Booting [/kernel]...
Kernel entry at 0x800000e0 ...
GDB: no debug ports present
KDB: debugger backends: ddb
KDB: current backend: ddb
Copyright (c) 1996-2011, 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 11.1R1.8 #0: 2011-03-09 20:14:25 UTC
```

```

user@juniper.net:/volume/build/junos/11.1/release/11.1R1.8/obj-powerpc/bsd/kernels/
  JUNIPER-EX/kernel
Timecounter "decrementer" frequency 50000000 Hz quality 0
cpu0: Freescale e500v2 core revision 2.2
cpu0: HID0 80004080
...

```

request system zeroize media

```

user@host> request system zeroize media
warning: System will be rebooted and may not boot without configuration
Erase all data, including configuration and log files? [yes,no] (no) yes

warning: ipsec-key-management subsystem not running - not needed by configuration.
warning: zeroizing fpc0

{master:0}
root> Waiting (max 60 seconds) for system process `vnlru' to stop...done
...
Syncing disks, vnodes remaining...2 4 2 4 3 2 1 1 0 0 0 done

syncing disks... All buffers synced.
Uptime: 14m50s
recorded reboot as normal shutdown
Rebooting...

U-Boot 1.1.6 (Apr 21 2011 - 13:58:42)

Board: EX4200-48PX 1.1
EPLD: Version 8.0 (0x82)
DRAM: Initializing (512 MB)
FLASH: 8 MB
NAND: No NAND device found!!!
0 MiB

Firmware Version: --- 01.00.00 ---
USB: scanning bus for devices... 2 USB Device(s) found
      scanning bus for storage devices... 1 Storage Device(s) found

ELF file is 32 bit
Consoles: U-Boot console

FreeBSD/PowerPC U-Boot bootstrap loader, Revision 2.2
(vtseng@svl-junos-pool27.juniper.net, Fri Feb 26 17:48:51 PST 2010)
Memory: 512MB
Loading /boot/defaults/loader.conf
/kernel data=0x9abfdc+0xb06e4 syms=[0x4+0x83b30+0x4+0xbd7c6]

Hit [Enter] to boot immediately, or space bar for command prompt.
Booting [/kernel] in 1 second... Booting [/kernel]...
Kernel entry at 0x800000e0 ...
GDB: no debug ports present
KDB: debugger backends: ddb
KDB: current backend: ddb
Copyright (c) 1996-2011, 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 11.4R1.2 #0: 2011-10-27 18:05:39 UTC

```

```
user@juniper.net:/volume/build/junos/11.4/release/11.4R1.2/obj-powerpc/
bsd/kernels/JUNIPER-EX/kernel
can't re-use a leaf (all_slot_serialid)!
Timecounter "decrementer" frequency 50000000 Hz quality 0
cpu0: Freescale e500v2 core revision 2.2
cpu0: HID0 80004080<EMCP,TBEN,EN_MAS7_UPDATE>
real memory = 511705088 (488 MB)
avail memory = 500260864 (477 MB)
ETHERNET SOCKET BRIDGE initialising
Initializing EXSERIES platform properties ...
. . .
Automatic reboot in progress...
Media check on da0 on ex platforms
** /dev/da0s2a
FILE SYSTEM CLEAN; SKIPPING CHECKS
clean, 20055 free (31 frags, 2503 blocks, 0.0% fragmentation)
zeroizing /dev/da0s1a ...
. . .
zeroizing /dev/da0s3d ...
. . .
zeroizing /dev/da0s3e ...
. . .
zeroizing /dev/da0s4d ...
. . .
zeroizing /dev/da0s4e ...
. . .

syncing disks... All buffers synced.
Uptime: 3m40s
Rebooting...

U-Boot 1.1.6 (Apr 21 2011 - 13:58:42)

Board: EX4200-48PX 1.1
EPLD: Version 8.0 (0x82)
DRAM: Initializing (512 MB)
FLASH: 8 MB
NAND: No NAND device found!!!
0 MiB

Firmware Version: --- 01.00.00 ---
USB: scanning bus for devices... 2 USB Device(s) found
      scanning bus for storage devices... 1 Storage Device(s) found

ELF file is 32 bit
Consoles: U-Boot console

FreeBSD/PowerPC U-Boot bootstrap loader, Revision 2.2
(vtseng@svl-junos-pool27.juniper.net, Fri Feb 26 17:48:51 PST 2010)
Memory: 512MB
Loading /boot/defaults/loader.conf
/kernel data=0x9abfdc+0xb06e4 syms=[0x4+0x83b30+0x4+0xbd7c6]

Hit [Enter] to boot immediately, or space bar for command prompt.
Booting [/kernel] in 1 second... Booting [/kernel]...
Kernel entry at 0x800000e0 ...
GDB: no debug ports present
KDB: debugger backends: ddb
KDB: current backend: ddb
Copyright (c) 1996-2011, 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 11.4R1.2 #0: 2011-10-27 18:05:39 UTC
user@juniper.net:/volume/build/junos/11.4/release/11.4R1.2/obj-powerpc/
bsd/kernels/JUNIPER-EX/kernel
can't re-use a leaf (all_slot_serialid)!
Timecounter "decrementer" frequency 50000000 Hz quality 0
cpu0: Freescale e500v2 core revision 2.2
cpu0: HID0 80004080 <EMCP,TBEN,EN_MAS7_UPDATE>
real memory = 511705088 (488 MB)
avail memory = 500260864 (477 MB)
ETHERNET SOCKET BRIDGE initialising
Initializing EXSERIES platform properties ...
. . .
Automatic reboot in progress...
Media check on da0 on ex platforms
** /dev/da0s1a
FILE SYSTEM CLEAN; SKIPPING CHECKS
clean, 20064 free (48 frags, 2502 blocks, 0.1% fragmentation)
zeroizing /dev/da0s2a ...
. . .
Creating initial configuration...mgd: error: Cannot open configuration file:
/config/juniper.conf
mgd: warning: activating factory configuration
mgd: commit complete
mgd: -----
mgd: Please login as 'root'. No password is required.
mgd: To start Initial Setup, type 'ezsetup' at the JUNOS prompt.
mgd: To start JUNOS CLI, type 'cli' at the JUNOS prompt.
mgd: -----
Setting initial options: debugger_on_panic=NO debugger_on_break=NO.
Starting optional daemons: .
Doing initial network setup:
. . .

Amnesiac (ttyu0)

```

show system auto-snapshot

Syntax	show system auto-snapshot
Release Information	Command introduced in Junos OS Release 12.3 for EX Series switches.
Description	<p>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.</p> <p>When the automatic snapshot procedure is in progress, you cannot run the manual snapshot command, request system snapshot.</p>
Options	This command has no options.
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> • Understanding Resilient Dual-Root Partitions on Switches on page 7
List of Sample Output	show system auto-snapshot on page 119
Output Fields	Table 12 on page 118 describes the output fields for the show system auto-snapshot command. Output fields are listed in the approximate order in which they appear.

Table 12: show system auto-snapshot status Output Fields

Field Name	Field Description
Auto-snapshot configuration	<p>Status of the configuration:</p> <ul style="list-style-type: none"> • Enabled—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. • Disabled—The system does not automatically take a snapshot of the alternate partition. You must use the manual snapshot command, request system snapshot, to take a snapshot of one partition and copy it onto the other.
Auto-snapshot state	<p>Status of the automatic snapshot procedure:</p> <ul style="list-style-type: none"> • Completed—The automatic snapshot procedure has completed copying the alternate partition to the primary partition. • Disabled—The automatic snapshot procedure is inactive. • In progress—The automatic snapshot procedure is in progress. It takes about 10 to 15 minutes to complete, depending upon disk size.

Sample Output

`show system auto-snapshot`

```
user@switch> show system auto-snapshot
Auto-snapshot Configuration: Enabled
Auto-snapshot State: Disabled
```

show system autoinstallation status

Syntax	show system autoinstallation status
Release Information	Command introduced before Junos OS Release 7.4. Command introduced in Junos OS Release 9.0 for EX Series switches. Command supported in Junos OS Release 12.2 for ACX Series Universal Access Routers.
Description	(ACX Series routers, J Series routers, and EX Series switches only) Display autoinstallation status information.
Options	This command has no options.
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> • <i>ACX Series Autoinstallation Overview</i> • <i>Before You Begin Autoinstallation on an ACX Series Universal Access Router</i> • <i>Autoinstallation Configuration of ACX Series Universal Access Routers</i> • <i>USB Autoinstallation on ACX Series Routers</i> • <i>Verifying Autoinstallation on ACX Series Universal Access Routers</i> • <i>autoinstallation</i>
List of Sample Output	show system autoinstallation status on page 121
Output Fields	Table 13 on page 120 describes the output fields for the show system autoinstallation status command. Output fields are listed in the approximate order in which they appear.

Table 13: show system autoinstallation status Output Fields

Field Name	Field Description
Autoinstallation status	<p>Display autoinstallation status information:</p> <ul style="list-style-type: none"> • Last committed file—File last committed for autoinstallation configuration. • Configuration server of last committed file—IP address or URL of the server configured to retrieve configuration information for the last committed configuration file. • Interface—Interface configured for autoinstallation. <ul style="list-style-type: none"> • Name—Name of the interface. • State—Interface state. • Address acquisition—Display IP address acquired and protocol used for acquisition upon startup. <ul style="list-style-type: none"> • Protocol—Protocol used for acquisition: BOOTP/DHCP or RARP. • Acquired address—IP address acquired from the DHCPserver.

Sample Output

show system autoinstallation status

```
user@host> show system autoinstallation status
Autoinstallation status:
Master state: Active
Last committed file: None
Configuration server of last committed file: 0.0.0.0
Interface:
  Name: ge-0/0/1
  State: None
  Address acquisition:
    Protocol: DHCP Client
    Acquired address: None
    Protocol: RARP Client
    Acquired address: None
```

show system boot-messages

List of Syntax	Syntax on page 122 Syntax (EX Series Switches) on page 122 Syntax (TX Matrix Router) on page 122 Syntax (TX Matrix Plus Router) on page 122 Syntax (MX Series Router) on page 122 Syntax (QFX Series) on page 122
Syntax	show system boot-messages
Syntax (EX Series Switches)	show system boot-messages <all-members> <local> <member <i>member-id</i> >
Syntax (TX Matrix Router)	show system boot-messages <all-chassis all-lcc lcc <i>number</i> scc>
Syntax (TX Matrix Plus Router)	show system boot-messages <all-chassis all-lcc lcc <i>number</i> sfc <i>number</i> >
Syntax (MX Series Router)	show system boot-messages <all-members> <local> <member <i>member-id</i> >
Syntax (QFX Series)	show system boot-messages infrastructure <i>name</i> interconnect-device <i>name</i> node-group <i>name</i>
Release Information	Command introduced before 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.
Description	Display initial messages generated by the system kernel upon startup. These messages are the contents of <code>/var/run/dmesg.boot</code> .
Options	none —Display all boot time messages. all-chassis —(TX Matrix and TX Matrix Plus routers only) (Optional) Display boot time messages for all of the chassis. all-lcc —(TX Matrix and TX Matrix Plus routers only) (Optional) On a TX Matrix router, display boot time messages for all T640 routers (or line-card chassis) connected to a TX Matrix router. On a TX Matrix Plus router, display boot time messages for all T1600 routers (or line-card chassis) connected to a TX Matrix Plus router. all-members —(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 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 T1600 router connected to a TX Matrix Plus router. Replace ***number*** with a value from 0 through 3.

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 (or switch-fabric chassis). Replace ***number*** with 0.

Additional Information By default, when you issue the **show system boot-messages** command on a TX Matrix or TX Matrix Plus master Routing Engine, the command is broadcast to all the T640 (in a routing matrix based on a TX Matrix router) master Routing Engines or T1600 (in a routing matrix based on a TX Matrix Plus router) master Routing Engines connected to it. Likewise, if you issue the same command on the TX Matrix or TX Matrix Plus backup Routing Engine, the command is broadcast to all the T640 (in a routing matrix based on a TX Matrix router) backup Routing Engines or T1600 (routing matrix based on a TX Matrix Plus router) backup Routing Engines that are connected to it.

Required Privilege Level view

List of Sample Output [show system boot-messages \(TX Matrix Router\) on page 123](#)
[show system boot-messages lcc \(TX Matrix Router\) on page 125](#)
[show system boot-messages \(TX Matrix Plus Router\) on page 125](#)
[show system boot-messages \(QFX3500 Switch\) on page 126](#)

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@single.juniper.net:/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,<b16>,<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

np0 flags 0x1 on motherboard

np0: 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@benten.juniper.net:/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,WE,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@lanath.juniper.net:/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@lanath.juniper.net:/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)
-----
```

```
Copyright (c) 1996-2010, 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 11.1I #0: 2010-09-17 19:18:07 UTC
```

```
ssiano@svl-junos-pool125.juniper.net:/c/ssiano/DEV_QFX_SI_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
```

```
ssiano@svl-junos-pool125.juniper.net:/c/ssiano/DEV_QFX_SI_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_bcp1d_probe[124]
qfx_bcp1d_probe[138]: dev_type=0x0
qfx_bcp1d_probe[124]
qfx_bcp1d0: QFX BCPLD probe success
qfx_bcp1d0qfx_bcp1d_attach[174]
qfx_bcp1d_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

Syntax	show system license <installed keys usage>
Release Information	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.
Description	Display licenses and information about how they are used.
Options	<p>none—Display all license information.</p> <p>installed—(Optional) Display installed licenses only.</p> <p>keys—(Optional) Display a list of license keys. Use this information to verify that each expected license key is present.</p> <p>usage—(Optional) Display the state of licensed features.</p>
Required Privilege Level	maintenance
List of Sample Output	show system license on page 130 show system license installed on page 130 show system license keys on page 131 show system license usage on page 131 show system license (QFX Series) on page 131
Output Fields	Table 14 on page 129 lists the output fields for the show system license command. Output fields are listed in the approximate order in which they appear.

Table 14: show system license Output Fields

Field Name	Field Description
Feature name	Name assigned to the configured feature. You use this information to verify that all the features for which you installed licenses are present.
Licenses used	<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>NOTE: In Junos OS Release 10.1 and later, the Licenses used 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 (scale-subscriber), L2TP (scale-l2tp), Mobile IP (scale-mobile-ip), and so on.</p>

Table 14: show system license Output Fields (*continued*)

Field Name	Field Description
Licenses installed	<p>Information about the installed license key:</p> <ul style="list-style-type: none"> • License identifier—Identifier associated with a license key. • State—State of the license key: valid or invalid. An invalid state indicates that the key was entered incorrectly or is not valid for the specific device. • License version—Version of a license. The version indicates how the license is validated, the type of signature, and the signer of the license key. • Valid for device—Device that can use a license key. • Group defined—Group membership of a device. • Features—Feature associated with a license, such as data link switching (DLSw).
Licenses needed	Number of licenses required for features being used but not yet properly licensed.
Expiry	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 xxxxxxx xxxxxxx xxxxxxx xxxxxxx xxxxxxx
          xxxxxxx xxxxxxx xxxxxxx xxxxxxx xxxxxxx
          xxxxxxx xxxxxxx 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 (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 snapshot

List of Syntax [Syntax on page 132](#)
 [Syntax \(EX Series Switches\) on page 132](#)

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.

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 88](#)
- List of Sample Output**
- [show system snapshot \(Router\) on page 133](#)
 - [show system snapshot media external \(Switch\) on page 133](#)
 - [show system snapshot media internal \(Switch\) on page 134](#)
- Output Fields**
- Table 15 on page 133 lists the output fields for the **show system snapshot** command. Output fields are listed in the approximate order in which they appear.

Table 15: 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)

Syntax	show system storage partitions <all-members> <local> <member <i>member-id</i> >
Release Information	Command introduced in Junos OS Release 11.1 for EX Series switches.
Description	Display information about the disk partitions on EX Series switches.
Options	<p>none—Display partition information.</p> <p>all-members—(Virtual Chassis systems only) (Optional) Display partition information for all members of the Virtual Chassis.</p> <p>local—(Virtual Chassis systems only) (Optional) Display partition information for the local Virtual Chassis member.</p> <p>member <i>member-id</i>—(Virtual Chassis systems only) (Optional) Display partition information for the specified member of the Virtual Chassis configuration.</p>
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> • Verifying Junos OS and Boot Loader Software Versions on an EX Series Switch on page 68
List of Sample Output	show system storage partitions on page 136
Output Fields	Table 16 on page 135 describes the output fields for the show system storage partitions command. Output fields are listed in the approximate order in which they appear.

Table 16: 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"> • Partition—Partition identifier. • Size—Size of partition. • Mountpoint—Directory on which the partition is mounted.

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)
```

PART 5

Troubleshooting

- [Troubleshooting Procedures on page 139](#)

CHAPTER 13

Troubleshooting Procedures

- [Troubleshooting Software Installation on page 139](#)
- [Troubleshooting a Switch That Has Booted from the Backup Junos OS Image on page 142](#)
- [Resilient Dual-Root Partitions Frequently Asked Questions on page 143](#)

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 139](#)
- [Rebooting from the Inactive Partition on page 140](#)
- [Freeing Disk Space for Software Installation on page 141](#)
- [Installation from the Boot Loader Generates 'cannot open package' Error on page 141](#)

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 43](#) 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=diskxy:
```

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

- [Upgrading EX Series Switches to Support Resilient Dual-Root Partitions](#)
- [Installing Software on an EX Series Switch with a Single Routing Engine \(CLI Procedure\) on page 28](#)
- [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 34](#)
- [Understanding Software Installation on EX Series Switches on page 3](#)
- [show system storage partitions \(EX Series Switches Only\) on page 135](#)

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 68](#)
 - [Troubleshooting Software Installation on page 139](#)
 - [show system storage partitions \(EX Series Switches Only\) on page 135](#)

Resilient Dual-Root Partitions Frequently Asked Questions

This FAQ addresses questions regarding resilient dual-root partitions on EX Series switches and upgrading to Junos OS releases that support resilient dual-root partitions. 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:

- [How Does Upgrading to Junos OS Release 10.4R3 and Later Differ from Normal Upgrades? on page 144](#)
- [What Happens If I Do Not Upgrade Both the Loader Software and Junos OS at the Same Time? on page 144](#)
- [Can I Downgrade Junos OS Without Downgrading the Loader Software? on page 145](#)
- [Can I Upgrade to a Resilient Dual-Root Partition Release by Using the CLI? on page 145](#)
- [Will I Lose My Configuration During an Upgrade? on page 146](#)
- [How Long Will the Upgrade Process Take? on page 146](#)
- [What Happens to My Files If the System Detects a File System Corruption and Automatic Snapshot is Enabled? on page 146](#)
- [What Happens to My Files If the System Detects a File System Corruption and Automatic Snapshot is Not Enabled? on page 147](#)
- [How Will I Be Informed If My Switch Boots from the Alternate Slice Because of Corruption in the Root File System? on page 147](#)
- [Can I Use Automatic Software Update and Download to Upgrade to a Resilient Dual-Root Partition Release? on page 148](#)

- [Why Is the Message "At least one package installed on this device has limited support" Displayed When Users Log In to a Switch?](#) on page 148
- [Where Can I Find Instructions for Upgrading?](#) on page 148

How Does Upgrading to Junos OS Release 10.4R3 and Later Differ from Normal Upgrades?

Upgrading from Junos OS Release 10.4R2 or earlier to Release 10.4R3 or later differs from other upgrades in these ways:

- You must upgrade the loader software in addition to installing the new Junos OS image.
- Rebooting after the upgrade reformats the disk from three partitions to four partitions.
- The upgrade process and the reboot take longer time because of the additional time required for upgrading the loader software and for the first reboot after the Junos OS installation (longer than normal because it reformats the disk from three partitions to four). Also, EX8200 switches require an additional reboot per Routing Engine as part of the loader software upgrade.

What Happens If I Do Not Upgrade Both the Loader Software and Junos OS at the Same Time?

You must install a new loader software package if you are upgrading to a release that supports resilient dual-root partitions (Release 10.4R3 and later) from an earlier release (Release 10.4R2 and earlier).

If you upgrade to Release 10.4R3 or later from Release 10.4R2 or earlier and do not upgrade the loader software, the switch will come up and function normally. However, if the switch encounters a problem and cannot boot from the active root partition, it cannot transparently boot from the alternate root partition and you will need to perform a manual reboot.

Table 17: Combinations of Junos OS Versions and Loader Software Versions

Junos OS Release	Loader Software	Notes
Release 10.4R3 and later	<p>New loader software</p> <p>For all EX Series switches except EX8200 switches: U-Boot 1.1.6 (Mar 11 2011 - 04:39:06) 1.0.0 (Contains version 1.0.0 after the timestamp.)</p> <p>For EX8200 switches: U-Boot 1.1.6 (Jan 11 2008 - 05:24:35) 3.5.0 (Contains version 3.5.0.)</p>	Recommended
Release 10.4R2 and earlier	Old loader software	If you downgrade to Release 10.4R2 or earlier after having upgraded to the new loader software version, you do not need to downgrade the loader software. The switch will function normally.

Table 17: Combinations of Junos OS Versions and Loader Software Versions (*continued*)

Junos OS Release	Loader Software	Notes
Release 10.4R3 and later	<p>Old loader software</p> <p>For all EX Series switches except EX8200 switches: U-Boot 1.1.6 (Jan 11 2008 - 05:24:35) (Does not contain a version number after the timestamp)</p> <p>For EX8200 switches: U-Boot 1.1.6 (Jan 11 2008 - 05:24:35) 2.3.0 (Contains a version earlier than 3.5.0.)</p>	The switch will come up and function normally. However, in the event that the switch cannot boot from the active root partition, it will not transparently boot up from the alternate root partition.
Release 10.4R2 and earlier	<p>New loader software</p> <p>NOTE: For EX Series switches except EX8200 switches, in Release 10.4R2 and earlier the version number after the timestamp (shown in the previous row) is not displayed, and you cannot verify whether the old or the new loader software version is installed.</p>	The switch will come up and function normally.

Can I Downgrade Junos OS Without Downgrading the Loader Software?

Yes, when you downgrade from most releases, the new loader software runs seamlessly with the earlier Junos OS version.



NOTE: If you downgrade specifically from Release 10.4R3 or Release 11.1R1 to 10.4R2 or earlier (that is, to a release that does not support resilient dual-root partitions), you must disable the boot-sequencing function. If you do not take this action, the switch will boot on each subsequent reboot from the alternate root partition rather than from the active partition.

Disable the boot-sequencing function in one of two ways:

- From the shell as the root user:

```
% nvram setenv boot.btsq.disable 1
```
- From a console connection, reboot and stop at the u-boot prompt (Ctrl+c):

```
=> setenv boot.btsq.disable 1
=> saveenv
```

If you are downgrading from Release 10.4R4 or from Release 11.1R2 or later to Release 10.4R2 or earlier, you do not need to disable the boot-sequencing function—the software does it automatically.

Can I Upgrade to a Resilient Dual-Root Partition Release by Using the CLI?

Yes, you can perform the entire upgrade to resilient dual-root partitions from the CLI. You download both the new loader software and Junos OS packages and install them

from the CLI. During the final reboot, the disk is automatically reformatted from three to four partitions.

Will I Lose My Configuration During an Upgrade?

Configuration files are preserved and restored during the reformatting of the disk. We recommend that you save your configuration before upgrading because if there is a power interruption during the installation process, the files might be lost.

How Long Will the Upgrade Process Take?

The process of upgrading to a resilient dual-root partition release takes longer than other upgrades because of the additional step of upgrading the loader software and the longer reboot time required while the disk is reformatted to four partitions during the reboot of the switch that completes the Junos OS upgrade. The reformat results in an additional reboot time of 5 to 10 minutes for EX2200, EX3200, EX4200, and EX4500 switches. For EX8200 switches, the reboot time increases by 10 to 25 minutes per Routing Engine, and additional reboots are required.

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

If you have enabled automatic snapshot, 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 18 on page 146](#) shows the action the system takes if corruption is detected and the corrective action that you can take.

Table 18: 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 19 on page 147 shows the action the system takes if corruption is detected and the corrective action that you can take.

Table 19: 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 request system snapshot 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.

Can I Use Automatic Software Update and Download to Upgrade to a Resilient Dual-Root Partition Release?

Automatic software update and automatic software download are both supported with upgrading to releases that support resilient dual-root partitions. However, after an automatic installation, you must take the extra step of upgrading the loader software.

Automatic software update is for new members added to a Virtual Chassis that do not have the same software as the master. Once this feature is configured on the Virtual Chassis, any new member added with a different software version will be upgraded automatically.

Automatic software download uses the DHCP message exchange process to download and install software packages.

Why Is the Message "At least one package installed on this device has limited support" Displayed When Users Log In to a Switch?

The following message might be displayed when a user logs in:

```
Logging to master
..Password:
--- JUNOS 10.4R3.4 built 2011-03-19 22:06:32 UTC
At least one package installed on this device has limited support.
Run 'file show /etc/notices/unsupported.txt' for details.
```

This message can be safely ignored or you can permanently remove it. It appears because the jloader package file has been detected, and it only appears when Junos OS is installed before the loader software is upgraded (required only for EX8200 switches).

You can permanently remove this message by removing the jloader package and rebooting the system:

```
user@switch> request system software delete jloader-ex-zzzz
user@switch> request system reboot
```

Where *jloader-ex-zzzz* represents the name of the jloader software package for your platform—jloader-ex2200 for an EX2200 switch, jloader-ex3242 for an EX3200 or EX4200 switch, or jloader-ex8200 for an EX8200 switch.

Where Can I Find Instructions for Upgrading?

The procedure for upgrading to a release that supports resilient dual-root partitions (from a release that does not) is different from the normal upgrade procedure. For instructions on upgrading to a resilient dual-root partition release, see the Release Notes.

Related Documentation

- [Verifying Junos OS and Boot Loader Software Versions on an EX Series Switch on page 68](#)

- [Troubleshooting Software Installation on page 139](#)
- [Troubleshooting a Switch That Has Booted from the Backup Junos OS Image on page 142](#)
- [Verifying Junos OS and Boot Loader Software Versions on an EX Series Switch on page 68](#)

