



Junos[®] OS

Getting Started Guide for Routing Devices

Release
13.2



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Junos® OS Getting Started Guide for Routing Devices

13.2

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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:

- ACX Series
- M Series
- MX Series
- T Series
- J Series
- PTX 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 the *CLI User Guide*.

Documentation Conventions

Table 1 on page xv 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.

Table 2 on page xvi 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
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 book 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 System Basics Configuration 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)	Enclose 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)	Enclose a variable for which you can substitute one or more values.	community name members [<i>community-ids</i>]
Indentation and braces ({ })	Identify a level in the configuration hierarchy.	[edit] routing-options { static { route default { nexthop <i>address</i> ; retain; } } }
;(semicolon)	Identifies a leaf statement at a configuration hierarchy level.	

GUI Conventions

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

Convention	Description	Examples
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.
> (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 send your comments to techpubs-comments@juniper.net, or fill out the documentation feedback form at <https://www.juniper.net/cgi-bin/docbugreport/>. If you are using e-mail, be sure to include the following information with your comments:

- Document or topic name
- URL or page number
- Software release 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 JNASC 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:
<https://www.juniper.net/alerts/>
- 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

- [Junos OS Overview on page 3](#)
- [Junos OS Security Overview on page 29](#)
- [Junos OS Configuration Overview on page 35](#)
- [Junos OS Monitoring Tools Overview on page 45](#)

CHAPTER 1

Junos OS Overview

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Junos OS Overview

Juniper Networks provides high-performance network routers that create a responsive and trusted environment for accelerating the deployment of services and applications over a single network. The Junos operating system (Junos OS) is the foundation of these high-performance networks. Unlike other complex, monolithic software architectures, Junos OS incorporates key design and developmental differences to deliver increased network availability, operational efficiency, and flexibility. These key advantages are:

- One operating system
- One software release
- One modular software architecture

One Operating System

Unlike other network operating systems that share a common name but splinter into many different programs, the Junos® operating system is a single, cohesive operating system that is shared across all routers and product lines. This enables Juniper Networks engineers to develop software features once and share the features across product lines simultaneously. Because features are common to a single source, generally these features are implemented the same way for all of the product lines, reducing the training required to learn different tools and methods for each product. Furthermore, because all Juniper Networks products use the same code base, interoperability among products is not an issue.

One Software Release

Each new version of Junos OS is released concurrently for all product lines following a preset schedule. Each new version of software includes working features released in previous versions of the software and must achieve zero critical regression errors. This discipline ensures reliable operations for the entire release.

One Modular Software

Although individual modules of the Junos OS communicate through well-defined interfaces, each module runs in its own protected memory space, preventing one module from disrupting another. It also enables the independent restart of each module as necessary. This is in contrast to monolithic operating systems for which a malfunction in one module can ripple to other modules, possibly causing a full system crash or restart. This modular Junos architecture provides a high level of performance, high availability, security, and device scalability not found in other operating systems.

Junos OS is preinstalled on your Juniper Networks router when you receive it from the factory. When you first power on the router, all software starts automatically. You then configure the software so that the router can participate in your network.

You can upgrade the router software as new features are added or software problems are fixed. You obtain new software by downloading images from the Juniper Networks Support Web page onto your router or another system on your local network, then install the software upgrade onto the router.

Juniper Networks routers run only binaries supplied by Juniper Networks. Each Junos OS image includes a digitally signed manifest of executables, which are registered with the system only if the signature can be validated. Junos OS will not execute any binary without a registered fingerprint. This feature protects the system against unauthorized software and activity that might compromise the integrity of your router.

Related Documentation

- [Junos OS Configuration Basics on page 5](#)
- [Junos OS Architecture Overview on page 5](#)
- [Router Hardware Components on page 8](#)
- [Junos OS Commit Model for Router or Switch Configuration on page 9](#)
- [Junos OS Routing Engine Components and Processes on page 10](#)
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Junos OS Configuration Basics

Your router comes with Junos OS installed on it. When you power on the router, all software starts automatically. You simply need to configure the software so that the router will be ready to participate in the network.

To configure the Junos OS, you must specify a hierarchy of configuration statements that define the preferred software properties. You can configure all properties of the Junos OS, including interfaces, general routing information, routing protocols, and user access, as well as some system hardware properties. After you have created a candidate configuration, you commit the configuration to be evaluated and activated by the Junos OS.

Related Documentation

- [Junos OS Configuration from External Devices on page 25](#)
- [Methods for Configuring Junos OS on page 36](#)
- [Initial Router or Switch Configuration Using the Junos OS on page 43](#)

Junos OS Architecture Overview

This topic provides an overview of the Junos OS product and routing process architecture:

- [Product Architecture on page 5](#)
- [Routing Process Architecture on page 6](#)

Product Architecture

The Junos OS provides Internet Protocol (IP) routing software as well as software for interface, network, and chassis management. Junos OS runs on all Juniper Networks J Series, M Series, MX Series, and T Series routers, as well as on other Juniper Networks products.

- J Series Services Routers are deployed at the remote edge of distributed networks.
- M Series routers are mostly deployed in small and medium cores in peering, route reflector, data center applications, or at the IP or Multiprotocol Label Switching (MPLS) edge to support high-performance Layer 2 and Layer 3 services. All M Series routers have redundant power and cooling and the M10i, M20, M40e, M120, M160, and M320 routers have fully redundant hardware, including Routing Engines, switch interface components, and packet forwarding components. The M120 router also supports Forwarding Engine Board (FEB) failover. In the event of a FEB failure, a backup FEB can quickly take over packet forwarding.

- MX Series 3D Universal Edge Routers are Ethernet-optimized edge routers that provide both switching and carrier-class Ethernet routing. The MX Series routers support two types of Dense Port Concentrators (DPCs) with built-in Ethernet ports: Gigabit Ethernet 40-port and 10-Gigabit Ethernet 4-port.
- T Series routers (T320, T640, T1600, T4000, TX Matrix, and TX Matrix Plus routers) are deployed at the core of provider networks. These routers have fully redundant hardware, including power and cooling, Routing Engines, and Switch Interface Boards (SIBs).

A *routing matrix* is a multichassis architecture composed of multiple routers, for example, one TX Matrix router connected to one to four T640 routers, or one TX Matrix Plus router connected to one to four T1600 routers. From the perspective of the user interface, the routing matrix appears as a single router. On a routing matrix composed of a TX Matrix router and T640 routers, the TX Matrix router controls all of the T640 routers. On a routing matrix composed of a TX Matrix Plus router and T1600 or T4000 routers, the TX Matrix Plus router controls all the T1600 or T4000 routers.

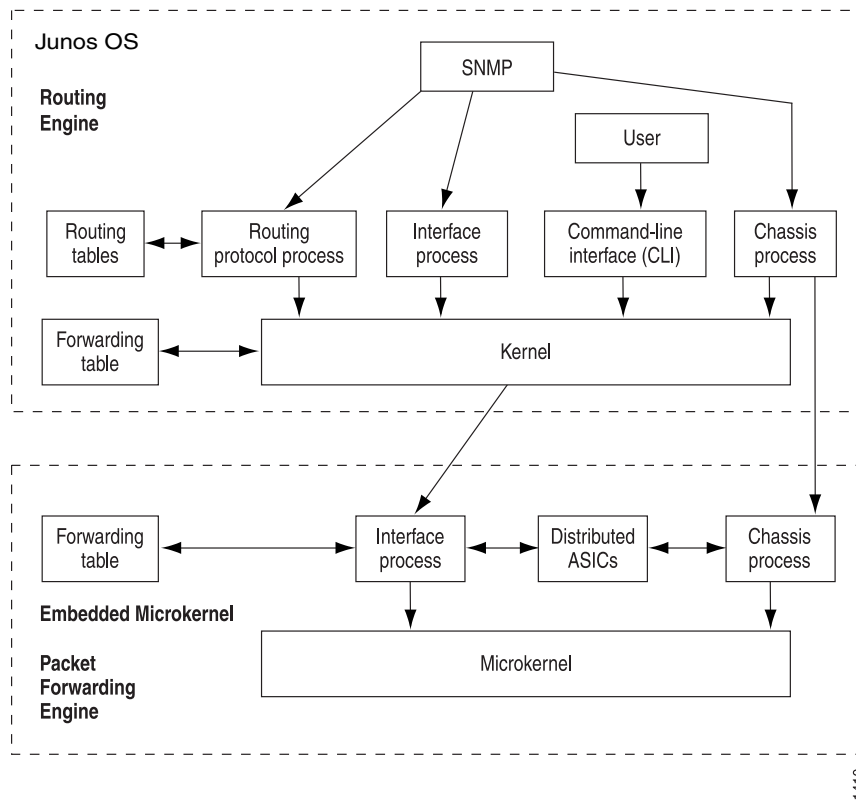
Routing Process Architecture

The routing process is handled by the following two components (see [Figure 1 on page 7](#)):

- Routing Engine
- Packet Forwarding Engine

Because this architecture separates control operations such as routing updates and system management from packet forwarding, the router can deliver superior performance and highly reliable Internet operation.

Figure 1: Product Architecture



Packet Forwarding Engine

The Packet Forwarding Engine uses application-specific integrated circuits (ASICs) to perform Layer 2 and Layer 3 packet switching, route lookups, and packet forwarding. The Packet Forwarding Engine forwards packets between input and output interfaces. The M Series routers (except the M7i, M40, and M320 routers) have redundant Packet Forwarding Engines. The J Series Services Routers have a software-based Packet Forwarding Engine.

Routing Engine

The Routing Engine controls the routing updates and the system management. The Routing Engine consists of routing protocol software processes running inside a protected memory environment on a general-purpose computer platform. The Routing Engine handles all of the routing protocol processes and other software processes that control the routers' interfaces, some of the chassis components, system management, and user access to the router. These routers and software processes run on top of a kernel that interacts with the Packet Forwarding Engine. All M Series (except the M7i and M40) routers and T Series routers have redundant Routing Engines.

The Routing Engine has these features:

- Routing protocol packets processing—All routing protocol packets from the network are directed to the Routing Engine, and therefore do not unnecessarily delay the Packet Forwarding Engine.
- Software modularity—Software functions are in separate processes, so a failure of one process has little or no effect on other software processes.
- In-depth IP functionality—Each routing protocol is implemented with a complete set of IP features and provides full flexibility for advertising, filtering, and modifying routes. Routing policies are set according to route parameters, such as prefix, prefix lengths, and Border Gateway Protocol (BGP) attributes.
- Scalability—Junos routing tables are designed to hold all the routes used in current and near-future networks. Additionally, Junos OS can efficiently support large numbers of interfaces and virtual circuits.
- Management interfaces—System management is implemented with a command-line interface (CLI), a craft interface, and Simple Network Management Protocol (SNMP).
- Storage and change management—Configuration files, system images, and microcode are held and maintained in one primary and two secondary storage systems, permitting local or remote upgrades.
- Monitoring efficiency and flexibility—Alarms are generated and packets are counted without adversely affecting packet forwarding performance.

The Routing Engine constructs and maintains one or more routing tables. From the routing tables, the Routing Engine derives a table of active routes, called the *forwarding table*, which is then copied into the Packet Forwarding Engine. The forwarding table in the Packet Forwarding Engine can be updated without interrupting the router's forwarding.

In a Junos-FIPS environment, hardware configurations with two Routing Engines must use IPsec and a private routing instance for all communications between the Routing Engines. IPsec communication between the Routing Engines and Adaptive Services (AS) II FIPS PICs is also required.

**Related
Documentation**

- [Junos OS Overview on page 3](#)
- *Routing Matrix with TX Matrix and TX Matrix Plus*

Router Hardware Components

Junos OS runs on Juniper Networks routers and Packet Transport Routers, including: ACX Series, J Series, M Series, MX Series, T Series, and PTX Series Packet Transport Routers. Each network device consists of the major hardware components as shown in [Table 3 on page 9](#). One or more of the major hardware components shown is used in each system.



NOTE: The ACX Series router is a single-board router with a built-in Routing Engine and one Packet Forwarding Engine. The “pseudo” FPCs and PICs are described in *ACX2000 and ACX2100 Routers Hardware and CLI Terminology Mapping*

Table 3: Major Router Hardware Components

	M Series	MX Series	T Series	PTX Series	J Series
Routing Engines	X	X	X	X	X
Control Board	X		X	X	
Switch Interface Board (SIB)	X		X	X	
Forwarding Engine Board (FEB)	X				
Power Supply	X	X	X	X	X
Cooling System	X	X	X	X	X
Dense Port Concentrators (DPC)		X			
Switch Control Board (SCB)		X			
Flexible PIC Concentrators (FPC)	X	X	X	X	
Physical Interface Module (PIM)					X
Physical Interface Card (PIC)	X	X	X	X	

Flexible PIC Concentrators (FPCs) are each populated by PICs for various interface types. On some routers, the PICs are installed directly in the chassis.

For information about specific components in your router, see the hardware guide for your router.

Related Documentation

- [Junos OS Architecture Overview on page 5](#)

Junos OS Commit Model for Router or Switch Configuration

The router or switch configuration is saved using a commit model—a candidate configuration is modified as desired and then committed to the system. When a configuration is committed, the router or switch checks the configuration for syntax errors, and if no errors are found, the configuration is saved as **juniper.conf.gz** and activated. The formerly active configuration file is saved as the first rollback configuration file

(**juniper.conf.1.gz**), and any other rollback configuration files are incremented by 1. For example, **juniper.conf.1.gz** is incremented to **juniper.conf.2.gz**, making it the second rollback configuration file. The router or switch can have a maximum of 49 rollback configurations (numbered 1 through 49) saved on the system.

On the router or switch, the active configuration file and the first three rollback files (**juniper.conf.gz.1**, **juniper.conf.gz.2**, **juniper.conf.gz.3**) are located in the **/config** directory. If the file **rescue.conf.gz** is saved on the system, this file should also be saved in the **/config** directory. The factory default files are located in the **/etc/config** directory.

There are two mechanisms used to propagate the configurations between Routing Engines within a router or switch:

- Synchronization—Propagates a configuration from one Routing Engine to a second Routing Engine within the same router or switch chassis.



NOTE: The QFX3500 switch has only one Routing Engine.

To synchronize configurations, use the **commit synchronize** CLI command. If one of the Routing Engines is locked, the synchronization fails. If synchronization fails because of a locked configuration file, you can use the **commit synchronize force** command. This command overrides the lock and synchronizes the configuration files.

- Distribution—Propagates a configuration across the routing plane on a multichassis router or switch. Distribution occurs automatically. There is no user command available to control the distribution process. If a configuration is locked during a distribution of a configuration, the locked configuration does not receive the distributed configuration file, so the synchronization fails. You need to clear the lock before the configuration and resynchronize the routing planes.



NOTE: When you use the **commit synchronize force** CLI command on a multichassis platform, the forced synchronization of the configuration files does not affect the distribution of the configuration file across the routing plane. If a configuration file is locked on a router or switch remote from the router or switch where the command was issued, the synchronization fails on the remote router or switch. You need to clear the lock and reissue the **synchronization** command.

Related Documentation

- [Configuring Junos OS for the First Time on a Router or Switch with a Single Routing Engine on page 51](#)
- *commit*

Junos OS Routing Engine Components and Processes

Junos OS runs on the Routing Engine. Junos OS consists of software processes that support Internet routing protocols, control router interfaces and the router chassis, and

enable router system management. Junos OS processes run on top of a kernel, which enables communication between processes and provides a direct link to the Packet Forwarding Engine software. Junos OS can be used to configure routing protocols and router interface properties, as well as to monitor and troubleshoot protocol and network connectivity problems.

The Routing Engine software consists of several software processes that control router functionality and a kernel that provides the communication among all the processes.

Routing Engine Kernel

The Routing Engine kernel provides the underlying infrastructure for all Junos OS processes, including providing the link between the routing tables and the Routing Engine's forwarding table. The kernel is also responsible for all communication with the Packet Forwarding Engine, which includes keeping the Packet Forwarding Engine's copy of the forwarding table synchronized with the master copy in the Routing Engine.

Initialization Process

When the router boots, an initialization process (init) within the Junos OS starts and monitors all the other software processes.

If a software process terminates or fails to start when called, the init process attempts to restart it a limited number of times and logs any failure information for further investigation.

Management Process

The management process (mgd) manages the configuration of the router and all user commands. The management process is responsible for notifying other processes when a new configuration is committed. A dedicated management process handles Junos XML protocol XML requests from its client, which may be the command-line interface (CLI) or any Junos XML protocol client.

Process Limits

There are limits to the total number of Junos OS processes that can run simultaneously on a system. There are also limits set for the maximum number of iterations of any single process. The limit for iterations of any single process can only be reached if the limit of overall system processes is not exceeded.

Access methods such as telnet and SSH spawn multiple system processes for each session created. For this reason, it might not be possible to simultaneously support the maximum number of access sessions for multiple services.

Routing Protocol Process

Within the Junos OS, the routing protocol process (rpd) controls the routing protocols that run on the router. The rpd process starts all configured routing protocols and handles all routing messages. It maintains one or more routing tables, which consolidate the routing information learned from all routing protocols. From this routing information, the routing protocol process determines the active routes to network destinations and installs these routes into the Routing Engine's forwarding table. Finally, rpd implements routing

policy, which enables you to control the routing information that is transferred between the routing protocols and the routing table. Using routing policy, you can filter and limit the transfer of information as well as set properties associated with specific routes.

Interface Process

The Junos interface process enables you to configure and control the physical interface devices and logical interfaces present in a router. You can configure interface properties such as the interface location, for example, in which slot the Flexible PIC Concentrator (FPC) is installed and in which location on the FPC the Physical Interface Card (PIC) is installed, also the interface encapsulation, and interface-specific properties. You can configure the interfaces currently present in the router, as well as interfaces that are not present but that you might add later.

The Junos interface process communicates through the Junos kernel with the interface process in the Packet Forwarding Engine, enabling Junos OS to track the status and condition of the router's interfaces.

Chassis Process

The Junos chassis process (chassisd) enables you to configure and control the properties of the router, including conditions that trigger alarms. The chassisd on the Routing Engine communicates directly with its peer processes running on the Packet Forwarding Engine.

SNMP and MIB II Processes

Junos OS supports the Simple Network Management Protocol (SNMP), which helps administrators monitor the state of a router. The software supports SNMP version 1 (SNMPv1), version 2 (SNMPv2, also known as version 2c, or v2c), and version 3 (SNMPv3). The Junos OS implementation of SNMP does not include any of the security features that were originally included in the IETF SNMP drafts but were later dropped. The SNMP software is controlled by the Junos SNMP and Management Information Base II (MIB II) processes, which consists of an SNMP master agent and various subagents.

Related Documentation

- [Junos OS Architecture Overview on page 5](#)

Understanding the Junos Configuration Groups

This topic provides you an overview of the configuration groups feature and the inheritance model in Junos OS, and contains the following sections:

- [Configuration Groups Overview on page 12](#)
- [Inheritance Model on page 13](#)
- [Configuring Configuration Groups on page 13](#)

Configuration Groups Overview

The configuration groups feature in Junos OS enables you to create a group containing configuration statements and to direct the inheritance of that group's statements in the rest of the configuration. The same group can be applied to different sections of the

configuration, and different sections of one group's configuration statements can be inherited in different places in the configuration.

Configuration groups enable you to create smaller, more logically constructed configuration files, making it easier to configure and maintain Junos OS. For example, you can group statements that are repeated in many places in the configuration, such as when configuring interfaces, and thereby limit updates to just the group.

You can also use wildcards in a configuration group to allow configuration data to be inherited by any object that matches a wildcard expression.

The configuration group mechanism is separate from the grouping mechanisms used elsewhere in the configuration, such as BGP groups. Configuration groups provide a generic mechanism that can be used throughout the configuration but that are known only to Junos OS command-line interface (CLI). The individual software processes that perform the actions directed by the configuration receive the expanded form of the configuration—they have no knowledge of configuration groups.

Inheritance Model

Configuration groups use true inheritance, which involves a dynamic, ongoing relationship between the source of the configuration data and the target of that data. Data values changed in the configuration group are automatically inherited by the target. The target need not contain the inherited information, although the inherited values can be overridden in the target without affecting the source from which they were inherited.

This inheritance model allows you to see only the instance-specific information without seeing the inherited details. A command pipe in configuration mode allows you to display the inherited data.

Configuring Configuration Groups

For areas of your configuration to inherit configuration statements, you must first put the statements into a configuration group and then apply that group to the levels in the configuration hierarchy that require the statements.

To configure configuration groups and inheritance, you can include the **groups** statement at the **[edit]** hierarchy level:

```
[edit]
groups {
  group-name {
    configuration-data;
  }
}
```

Include the **apply-groups [group-names]** statement anywhere in the configuration where the configuration statements contained in a configuration group are needed.

Related Documentation

- [Creating a Junos Configuration Group on page 95](#)

Using Conditions to Apply Configuration Groups Overview

You can use the **when** statement at the `[edit groups group-name]` hierarchy level to define conditions under which a configuration group should be applied.

You can configure a group to be applied based on the type of chassis, model, or routing-engine, virtual chassis member, cluster node, and start and optional end time of day or date.

For example, you could use the **when** statement to create a generic configuration group for each type of node and then apply the configuration based on certain node properties, such as chassis or model.

Related Documentation

- [Example: Configuring Conditions for Applying Configuration Groups on page 100](#)

List of Junos OS Processes

Junos OS consists of multiple processes that run on different platforms and have unique functions. The separation of functions provides operational stability, because each process accesses its own protected memory space.

[Table 4 on page 14](#) describes the processes that run only on MX Series 3D Universal Edge Routers.

Table 4: Junos OS Processes on MX Series Platform Only

Process	Name	Description
Clksync process (RE)	clksyncd	Defines the operation of synchronous Ethernet and Precision Time Protocol (PTP) on a Juniper MX Series router. The operation includes communication with the Packet Forwarding Engine (clock-sync module) to program and process clock events from the EEC clock.
		Operates the PTP stack, exchanges packets, and handles the configuration changes for the modular MX Series (MX80).
		Controls the configuration and monitoring of the overall operation of the PTP functionality for chassis-based MX platforms (MX240, MX480, and so on).
Clock-sync process (PFE)	clock-sync	<p>Programs and monitors the modular interface card (MIC), the CPLD, and the EEC clock. Peer of the clksyncd process module.</p> <p>Captures all PTP and Synchronous Ethernet statistics on the Packet Forwarding Engine and provides them to the Routing Engine.</p>

Table 4: Junos OS Processes on MX Series Platform Only (*continued*)

Process	Name	Description
Interchassis communication process	iccpd	Exchanges proprietary Junos OS messages between two Juniper MX Series routers that take part in a multi-chassis link aggregation group (LAG).
Statistics agent process	stats-agentd	<p>Acts as a relay process to collect interface statistics for all software development kit (SDK) applications.</p> <p>Interacts with the pfed process to collect the logical interface statistics for SDK applications.</p>

Table 5 on page 15 lists all the other processes that are common across platforms.

Table 5: Junos OS Processes

Name	Process	Description
Adaptive services process	adaptive-services	Manages the configuration for stateful firewall, Network Address Translation (NAT), intrusion detection service (IDS), and IP Security (IPsec) services on the Adaptive Services PIC.
Alarm control process	alarm-control	Configures the system alarm.
Access Node Control Protocol (ANCP) process	ancpd-service	Works with a special Internet Group Management Protocol (IGMP) session to collect outgoing interface mapping events in a scalable manner.
Application identification process	application-identification	Identifies an application using intrusion detection and prevention (IDP) to allow or deny traffic based on applications running on standard or nonstandard ports.
RADIUS accounting process	audit-process	Gathers statistical data that can be used for general network monitoring, analyzing, and tracking usage patterns, for billing a user based upon the amount of time or type of services accessed.
Auto-configuration process	auto-configuration	Configures interfaces automatically.
Boot process	bootp	Enables a router, switch, or interface to act as a Dynamic Host Configuration Protocol (DHCP) or bootstrap protocol (BOOTP) relay agent. DHCP relaying is disabled.
Captive portal content delivery process	captive-portal-content-delivery	Specifies the location to which a subscriber's initial Web browser session is redirected, enabling initial provisioning and service selection for the subscriber.

Table 5: Junos OS Processes (*continued*)

Name	Process	Description
Universal Edge Layer 2 Tunneling Protocol process	ce-l2tp-service	(M10, M10i, M7i, and MX Series routers only) Establishes L2TP tunnels and Point-to-Point Protocol (PPP) sessions through L2TP tunnels.
Ethernet OAM connectivity fault management process	cfm	Monitors the physical link between two switches.
Chassis control process	chassis-control	Manages the chassis.
Class of service process	class-of-service	Controls the router's or switch's CoS configuration.
Ethernet clock synchronization process	clksyncd-service	Uses Synchronous Ethernet (SyncE) for external clock synchronization .
Craft interface I/O control process	craft-control	Controls the I/O of the craft interface.
Database replication process	database-replication	(EX Series switches and MX Series routers only) Manages the replication of updates from the master to the slave in the database management system.
Datapath trace process	datapath-trace-service	Traces the path taken by the packet through the network.
Dynamic Host Configuration Protocol process	dhcp-service	(EX Series switches and MX Series routers only) Enables a DHCP server to allocate network IP addresses and deliver configuration settings to client hosts without user intervention.
Diameter process	diameter-service	Implements the Diameter protocol which uses the Transmission Control Protocol (TCP) and Stream Control Transmission Protocol (SCTP) instead of User Datagram Protocol (UDP), for monitoring the network.
Disk monitoring process	disk-monitoring	Checks the health of the hard disk drive on the Routing Engine.
Dynamic flow capture (DFC) process	dynamic-flow-capture	Controls the DFC configurations on Monitoring Services III PICs.
ECC parity errors logging process	ecc-error-logging	Logs the ECC parity errors into the memory on the Routing Engine.
Connectivity fault management (CFM) process	ethernet-connectivity-fault-management	Provides IEEE 802.1ag OAM CFM database information for CFM maintenance association end points (MEPs) in a CFM session.
Ethernet OAM Link-Fault-Management process	ethernet-link-fault-management	(EX Series switches and MX Series routers only) Provides the OAM link fault management (LFM) information for Ethernet interfaces.

Table 5: Junos OS Processes (*continued*)

Name	Process	Description
Event processing process	event-processing or eventd	Configures the application to handle all generated events.
Firewall process	firewall	Manages the firewall configuration and enables accepting or rejecting packets that are transiting an interface on a router or switch.
General authentication process	general-authentication-service	(EX Series switches and MX Series routers only) Manages general authentication of a user.
Inter-Chassis Communication Protocol (ICCP) process	iccp-service	Synchronizes data within a set of two (or more) PEs that form a redundancy group (RG).
IDP policy process	idp-policy	Enables various attack detection and prevention techniques on traffic traversing the network.
Integrated Local Management Interface process	ilmi	Provides bidirectional exchange of management information between two Asynchronous Transfer Mode (ATM) interfaces across a physical connection.
Inet process	inet-process	Configures the IP multicast family.
Init process	init	Initializes the USB modem.
Interface control process	interface-control	Controls the router's or switch's physical interface devices and logical interfaces.
Kernel replication process	kernel-replication	Replicates the state of the backup Routing Engine when graceful Routing Engine switchover (GRES) is configured.
Layer 2 address flooding and learning process	l2-learning	Enables a router to: <ul style="list-style-type: none"> Learn unicast media access control (MAC) addresses to avoid flooding the packets to all the ports in a bridge domain. Create a source MAC entry in its source and destination MAC tables for each MAC address learned from packets received on ports that belong to the bridge domain.
Layer 2 Control Protocol process	l2cpd-service	Enables features such as Layer 2 protocol tunneling and nonstop bridging.

Table 5: Junos OS Processes (*continued*)

Name	Process	Description
Link Aggregation Control Protocol process	lacp	The process: <ul style="list-style-type: none"> Provides a standardized means for exchanging information between partner systems on a link. Allows the link aggregation control instances to reach agreement on the identity of the Link Aggregation Group (LAG) to which the link belongs, and then to move the link to that LAG. Enables the transmission and reception processes for the link to function in an orderly manner.
Link management process	link-management	Manages traffic engineering links.
Local policy decision function process	local-policy-decision-function	Regulates the collection of statistics related to applications and application groups and tracking of information about dynamic subscribers and static interfaces.
Logical system multiplexer process	logical-system-mux or lrmuxd	Manages multiple instances of the routing protocols process (rpd) on a machine running logical routers.
MAC validation process	mac-validation	Configures MAC address validation that enables a router to validate if received packets contain a trusted IP source and an Ethernet MAC source address.
Management Information Base II process	mib-process	Provides the router's MIB II agent.
Mobile IP process	mobile-ip	Configures Junos OS Mobile IP features.
NFS mount requests process	mountd-service	(EX Series switches and MX Series routers only) Completes NFS mount requests.
MPLS Periodic Traceroute process	mpls-traceroute	Enables tracing of forwarding equivalence classes (FECs) for LDP Layered Service Providers (LSPs).
Multiservice process	mspd	Configures multiservice edge routers.
Multicast Snooping process	multicast-snooping	(EX Series switches and MX Series routers only) Makes Layer 3 information, such as the MAC addresses of members of a multicast group, known to Layer 2 devices, such as VLAN switches.
DNS server process	named-service	Enables a router or a switch to resolve hostnames into addresses.
Bidirectional Forwarding Detection process	neighbor-liveness	Displays the process, which specifies the maximum length of time that the router waits for its neighbor to re-establish an LDP session.

Table 5: Junos OS Processes (*continued*)

Name	Process	Description
Remote NFS server process	nfsd-service	Provides remote file access for applications that need NFS-based transport.
Network time process	ntp	Provides the mechanisms to synchronize time and coordinate time distribution in a large, diverse network.
Packet-triggered dynamic subscribers and policy control (PTCP) process	packet-triggered-subscribers	Enables the application of policies to dynamic subscribers that are controlled by a subscriber termination device.
Peer selection service process	peer-selection-service	Enables peer selection.
Periodic packet management process	periodic-packet-services	Processes a variety of time-sensitive periodic tasks so that other processes can more optimally direct their resources.
Packet Forwarding Engine process	pfed	Gathers and reports Packet Forwarding Engine statistics.
Packet gateway service process	pgcp-service or pgcpd	Configures the Packet Gateway Control Protocol (PGCP) that is required for the border gateway function (BGF) feature.
Pragmatic General Multicast process	pgm	Enables a reliable transport layer for multicast applications.
PIC services logging process	pic-services-logging or fsad (the file system access daemon)	Enables PICs to send special logging information to the Routing Engine for archiving on the hard disk.
Point-to-Point Protocol (PPP) process	ppp	Enables transporting IP traffic across point-to-point links.
Universal edge PPP process	ppp-service	Enables transporting IP traffic across universal edge routers.
Point-to-Point Protocol over Ethernet process	pppoe	Allows users to connect to a network of hosts over a bridge or access concentrator.
Process health monitor process	process-monitor or pmond	Extends the SNMP RMON alarm infrastructure to provide predefined monitoring for a selected set of object instances (such as file system usage, CPU usage, and memory usage) and dynamic object instances (such as Junos OS processes).

Table 5: Junos OS Processes (*continued*)

Name	Process	Description
Redundancy interface management process	redundancy-interface-process	Serves as an active or backup process of an application server and can be configured to process traffic for more than one logical application server.
Remote operations process	remote-operations	Provides the ping and traceroute MIBs.
Resource cleanup process	resource-cleanup	Enables cleaning of resources by entities other than the application itself.
Routing process	routing	Directs forwarding on the basis of routing tables, which maintain a record of the routes to various network destinations.
Traffic sampling control process	sampling	Performs packet sampling based on particular input interfaces and various fields in the packet header.
Session Border Control SBC configuration process	sbc-configuration-process	Configures the session border controller functionality that enables delivery of voice, video, and other multimedia services with assured quality and security.
SDK service process	sdk-service	Runs on the Routing Engine and enables communication between the SDK application and Junos OS. Although the SDK service process is present on the router, it is turned off by default.
Secure Neighbor Discovery (SND) protocol process	secure-neighbor-discovery or send	(EX Series switches and MX Series routers only) Provides support for protecting NDP messages.
Service Deployment System (SDX) process	service-deployment	Enables Junos OS to work with the Session and Resource Control (SRC) software.
Simple Network Management Protocol process	snmp	Enables the monitoring of network devices from a central location, and provides the router's or switch's SNMP master agent.
SONET Automatic Protection Switching (APS) process	sonet-aps	Monitors any SONET interface that participates in APS.
Static subscribers process	static-subscribers	Associates subscribers with statically configured interfaces, and provides dynamic service activation and activation for these subscribers.
Tunnel OAM process	tunnel-oamd	Enables the Operations, Administration, and Maintenance of Layer 2 tunneled networks.

Table 5: Junos OS Processes (*continued*)

Name	Process	Description
Virtual Router Redundancy Protocol (VRRP) process	vrrp	(EX Series switches and MX Series routers only) Enables hosts on a LAN to make use of redundant routing platforms on that LAN without requiring more than the static configuration of a single default route on the hosts.
Watchdog timer process	watchdog	Enables the watchdog timer when Junos OS encounters a problem.

Junos OS Support for IPv4 Routing Protocols

The Junos operating system (Junos OS) implements full IP routing functionality, providing support for IP version 4 (IPv4). The routing protocols are fully interoperable with existing IP routing protocols, and they have been developed to provide the scale and control necessary for the Internet core.

Junos OS provides the following routing and Multiprotocol Label Switching (MPLS) applications protocols:

- Unicast routing protocols:
 - BGP—Border Gateway Protocol, version 4, is an exterior gateway protocol (EGP) that guarantees loop-free exchange of routing information between routing domains (also called autonomous systems). BGP, in conjunction with Junos routing policy, provides a system of administrative checks and balances that can be used to implement peering and transit agreements.
 - ICMP—Internet Control Message Protocol router discovery enables hosts to discover the addresses of operational routers on the subnet.
 - IS-IS—Intermediate System-to-Intermediate System is a link-state interior gateway protocol (IGP) for IP networks that uses the shortest-path-first (SPF) algorithm, which also is referred to as the Dijkstra algorithm, to determine routes. The Junos IS-IS software is a new and complete implementation of the protocol, addressing issues of scale, convergence, and resilience.
 - OSPF—Open Shortest Path First, version 2, is an IGP that was developed for IP networks by the Internet Engineering Task Force (IETF). OSPF is a link-state protocol that makes routing decisions based on the SPF algorithm. The Junos OSPF software is a new and complete implementation of the protocol, addressing issues of scale, convergence, and resilience.
 - RIP—Routing Information Protocol, version 2, is a distance-vector IGP for IP networks based on the Bellman-Ford algorithm. RIP dynamically routes packets between a subscriber and a service provider without the subscriber having to configure BGP or participate in the service provider's IGP discovery process.
- Multicast routing protocols:

- DVMRP—Distance Vector Multicast Routing Protocol is a dense-mode (flood-and-prune) multicast routing protocol.
- IGMP—Internet Group Management Protocol, versions 1 and 2, is used to manage membership in multicast groups.
- MSDP—Multicast Source Discovery Protocol enables multiple Protocol Independent Multicast (PIM) sparse mode domains to be joined. A rendezvous point (RP) in a PIM sparse mode domain has a peer relationship with an RP in another domain, enabling it to discover multicast sources from other domains.
- PIM sparse mode and dense mode—Protocol-Independent Multicast is a multicast routing protocol. PIM sparse mode routes to multicast groups that might span wide-area and interdomain internets. PIM dense mode is a flood-and-prune protocol.
- SAP/SDP—Session Announcement Protocol and Session Description Protocol handle conference session announcements.
- MPLS applications protocols:
 - LDP—The Label Distribution Protocol provides a mechanism for distributing labels in non-traffic-engineered applications. LDP enables routers to establish label-switched paths (LSPs) through a network by mapping network layer routing information directly to data-link layer switched paths. LSPs created by LDP can also traverse LSPs created by the Resource Reservation Protocol (RSVP).
 - MPLS—Multiprotocol Label Switching, formerly known as tag switching, enables you to manually or dynamically configure LSPs through a network. It lets you direct traffic through particular paths rather than rely on the IGP's least-cost algorithm to choose a path.
 - RSVP—The Resource Reservation Protocol, version 1, provides a mechanism for engineering network traffic patterns that is independent of the shortest path decided upon by a routing protocol. RSVP itself is not a routing protocol; it operates with current and future unicast and multicast routing protocols. The primary purpose of the Junos RSVP software is to support dynamic signaling for MPLS LSPs.

- Related Documentation**
- [Junos OS Overview on page 3](#)
 - [Junos OS Support for IPv6 Routing Protocols on page 22](#)

Junos OS Support for IPv6 Routing Protocols

The Junos OS implements IP routing functionality, providing support for IP version 6 (IPv6). The routing protocols have been developed to provide the scale and control necessary for the Internet core.

The software supports the following unicast routing protocols:

- BGP—Border Gateway Protocol version 4, is an EGP that guarantees loop-free exchange of routing information between routing domains (also called autonomous systems). BGP, in conjunction with Junos routing policies, provides a system of administrative checks and balances that can be used to implement peering and transit agreements.
- ICMP—Internet Control Message Protocol router discovery enables hosts to discover the addresses of operational routers on the subnet.
- IS-IS—Intermediate System-to-Intermediate System is a link-state IGP for IP networks that uses the SPF algorithm, which also is referred to as the Dijkstra algorithm, to determine routes. The Junos OS supports a new and complete implementation of the protocol, addressing issues of scale, convergence, and resilience.
- OSPF version 3 (OSPFv3) supports IPv6. The fundamental mechanisms of OSPF such as flooding, designated router (DR) election, area-based topologies, and the SPF calculations remain unchanged. Some differences exist either because of changes in protocol semantics between IPv4 and IPv6, or because of the need to handle the increased address size of IPv6.
- RIP—Routing Information Protocol version 2 is a distance-vector IGP for IP networks based on the Bellman-Ford algorithm. RIP dynamically routes packets between a subscriber and a service provider without the subscriber having to configure BGP or to participate in the service provider's IGP discovery process.

**Related
Documentation**

- [Junos OS Overview on page 3](#)
- [Junos OS Support for IPv4 Routing Protocols on page 21](#)

Junos OS Routing and Forwarding Tables

A major function of the Junos OS routing protocol process is to maintain the Routing Engine's routing tables and use these tables to determine the active routes to network destinations. The routing protocol process then installs these routes into the Routing Engine's forwarding table. The Junos OS kernel then copies this forwarding table to the Packet Forwarding Engine.

The routing protocol process maintains multiple routing tables. By default, it maintains the following three routing tables. You can configure additional routing tables to suit your requirements.

- Unicast routing table—Stores routing information for all unicast routing protocols running on the router. BGP, IS-IS, OSPF, and RIP all store their routing information in this routing table. You can configure additional routes, such as static routes, to be included in this routing table. BGP, IS-IS, OSPF, and RIP use the routes in this routing table when advertising routing information to their neighbors.
- Multicast routing table (cache)—Stores routing information for all the running multicast protocols. DVMRP and PIM both store their routing information in this routing table, and you can configure additional routes to be included in this routing table.
- MPLS routing table—Stores MPLS path and label information.

With each routing table, the routing protocol process uses the collected routing information to determine active routes to network destinations.

For unicast routes, the routing protocol process determines active routes by choosing the most preferred route, which is the route with the lowest preference value. By default, the route's preference value is simply a function of how the routing protocol process learned about the route. You can modify the default preference value using routing policy and with software configuration parameters.

For multicast traffic, the routing protocol process determines active routes based on traffic flow and other parameters specified by the multicast routing protocol algorithms. The routing protocol process then installs one or more active routes to each network destination into the Routing Engine's forwarding table.

Related Documentation

- [Routing Policy Overview on page 24](#)

Routing Policy Overview

By default, all routing protocols place their routes into the routing table. When advertising routes, the routing protocols by default advertise only a limited set of routes from the routing table. Specifically, each routing protocol exports only the active routes that were learned by that protocol. In addition, the interior gateway protocols (IS-IS, OSPF, and RIP) export the direct (interface) routes for the interfaces on which they are explicitly configured.

You can control the routes that a protocol places into each table and the routes from that table that the protocol advertises. You do this by defining one or more routing policies and then applying them to the specific routing protocol.

Routing policies applied when the routing protocol places routes into the routing table are referred to as *import policies* because the routes are being imported into the routing table. Policies applied when the routing protocol is advertising routes that are in the routing table are referred to as *export policies* because the routes are being exported from the routing table. In other words, the terms *import* and *export* are used with respect to the routing table.

A routing policy enables you to control (filter) which routes a routing protocol imports into the routing table and which routes a routing protocol exports from the routing table. A routing policy also enables you to set the information associated with a route as it is being imported into or exported from the routing table. Filtering imported routes enables you to control the routes used to determine active routes. Filtering routes being exported from the routing table enables you to control the routes that a protocol advertises to its neighbors.

You implement routing policy by defining policies. A policy specifies the conditions to use to match a route and the action to perform on the route when a match occurs. For example, when a routing table imports routing information from a routing protocol, a routing policy might modify the route's preference, mark the route with a color to identify it and allow it to be manipulated later, or prevent the route from even being installed in a routing table. When a routing table exports routes into a routing protocol, a policy might

assign metric values, modify the BGP community information, tag the route with additional information, or prevent the route from being exported altogether. You also can define policies for redistributing the routes learned from one protocol into another protocol.

**Related
Documentation**

- [Junos OS Routing and Forwarding Tables on page 23](#)
- [Junos OS Support for IPv4 Routing Protocols on page 21](#)
- [Junos OS Support for IPv6 Routing Protocols on page 22](#)

Junos OS Support for VPNs

The Junos OS supports several types of virtual private networks (VPNs):

- **Layer 2 VPNs**—A Layer 2 VPN links a set of sites that share routing information, and whose connectivity is controlled by a collection of policies. A Layer 2 VPN is not aware of routes within a customer's network. It simply provides private links between a customer's sites over the service provider's existing public Internet backbone.
- **Layer 3 VPNs**—A Layer 3 VPN is the same thing as a Layer 2 VPN, but it is aware of routes within a customer's network, requiring more configuration on the part of the service provider than a Layer 2 VPN. The sites that make up a Layer 3 VPN are connected over a service provider's existing public Internet backbone.
- **Interprovider VPNs**—An interprovider VPN supplies connectivity between two VPNs in separate autonomous systems (ASs). This functionality can be used by a VPN customer with connections to several Internet service providers (ISPs), or different connections to the same ISP in various geographic regions.
- **Carrier-of-carrier VPNs**—Carrier-of-carrier VPNs allow a VPN service provider to supply VPN service to a customer who is also a service provider. The latter service provider supplies Internet or VPN service to an end customer.

**Related
Documentation**

- [Junos OS Overview on page 3](#)

Junos OS Configuration from External Devices

You can configure the router from a system console connected to the router's console port or by using Telnet to access the router remotely. The router provides three ports on the craft interface for connecting external management devices to the Routing Engine and the Junos OS:

- **Console port**—Connects a system console using an RS-232 serial cable.
- **Auxiliary port**—Connects a laptop or modem using an RS-232 serial cable.
- **Ethernet management port**—Connects the Routing Engine to a management LAN (or any other device that plugs into an Ethernet connection) for remote management through a PC or other client device. The Ethernet port is 10/100 megabits per second (Mbps) autosensing and requires an RJ-45 connector.

- Related Documentation**
- [Methods for Configuring Junos OS on page 36](#)
 - [Configuring the Junos OS to Set Console and Auxiliary Port Properties on page 83](#)

Junos OS Tracing and Logging Operations

Tracing and logging operations allow you to track events that occur in the router—both normal router operations and error conditions—and to track the packets that are generated by or passed through the router. The results of tracing and logging operations are placed in files in the `/var/log` directory on the router.

The Junos OS provides an option to do remote tracing for specific processes, which greatly reduces use of the router's internal storage for tracing and is analogous to remote system logging. You configure remote tracing system-wide using the **tracing** statement at the **[edit system]** hierarchy level. By default, remote tracing is not configured. You can disable remote tracing for specific processes using the **no-remote-trace** statement at the **[edit process-name traceoptions]** hierarchy level. This feature does not alter local tracing functionality in any way, and logging files are stored on the router.

The Junos OS supports remote tracing for the following processes:

- `chassisd`—Chassis-control process
- `eventd`—Event-processing process
- `cosd`—Class-of-service process
- `spd`—Adaptive-services process

Logging operations use a system logging mechanism similar to the UNIX `syslogd` utility to record systemwide, high-level operations, such as interfaces going up or down and users logging in to or out of the router. You configure these operations by using the **syslog** statement at the **[edit system]** hierarchy level, as described in *Junos OS System Log Configuration Overview*, and by using the **options** statement at the **[edit routing-options]** hierarchy level, as described in the *Junos OS Routing Protocols Library for Routing Devices*.

Tracing operations record more detailed messages about the operation of routing protocols, such as the various types of routing protocol packets sent and received, and routing policy actions. You configure tracing operations using the **traceoptions** statement. You can define tracing operations in different portions of the router configuration:

- Global tracing operations—Define tracing for all routing protocols. You define these tracing operations at the **[edit routing-options]** hierarchy level of the configuration.
- Protocol-specific tracing operations—Define tracing for a specific routing protocol. You define these tracing operations in the **[edit protocol]** hierarchy when configuring the individual routing protocol. Protocol-specific tracing operations override any equivalent operations that you specify in the global **traceoptions** statement. If there are no equivalent operations, they supplement the global tracing options. If you do not specify any protocol-specific tracing, the routing protocol inherits all the global tracing operations.

- Tracing operations within individual routing protocol entities—Some protocols allow you to define more granular tracing operations. For example, in Border Gateway Protocol (BGP), you can configure peer-specific tracing operations. These operations override any equivalent BGP-wide operations or, if there are no equivalents, supplement them. If you do not specify any peer-specific tracing operations, the peers inherit, first, all the BGP-wide tracing operations and, second, the global tracing operations.
- Interface tracing operations—Define tracing for individual router interfaces and for the interface process itself. You define these tracing operations at the **[edit interfaces]** hierarchy level of the configuration as described in the *Junos OS Network Interfaces Library for Routing Devices*.
- Remote tracing—To enable system-wide remote tracing, include the **destination-override syslog host** statement at the **[edit system tracing]** hierarchy level. This specifies the remote host running the system log process (syslogd), which collects the traces. Traces are written to file(s) on the remote host per the syslogd configuration in */etc/syslog.conf*. By default remote tracing is *not* configured.

To override the system-wide remote tracing configuration for a particular process, include the **no-remote-trace** statement at the **[edit process-name traceoptions]** hierarchy. When **no-remote-trace** is enabled, the process does local tracing.



NOTE: When remote tracing is configured, traces will go to the remote host.

To collect traces, use the **local0** facility as the selector in */etc/syslog.conf* on the remote host. To separate traces from various processes into different files, include the process name or trace-file name if it is specified at the **[edit process-name traceoptions file]** hierarchy level, in the Program field in */etc/syslog.conf*. If your syslog server supports parsing hostname and program-name, then you can separate traces from the various processes.

Related Documentation

- *Junos OS System Log Configuration Overview*

CHAPTER 2

Junos OS Security Overview

- [Junos OS Default Settings for Router Security on page 29](#)
- [Junos OS Features for Router Security on page 29](#)

Junos OS Default Settings for Router Security

The Junos OS protects against common router security weaknesses with the following default settings:

- The Junos OS does not forward directed broadcast messages. Directed broadcast services send ping requests from a spoofed source address to a broadcast address and can be used to attack other Internet users. For example, if broadcast ping messages were allowed on the 200.0.0.0/24 network, a single ping request could result in up to 254 responses to the supposed source of the ping. The source would actually become the victim of a denial-of-service (DoS) attack.
- Only console access to the router is enabled by default. Remote management access to the router and all management access protocols, including Telnet, FTP, and SSH (Secure Shell), are disabled by default.
- The Junos OS does not support the SNMP set capability for editing configuration data. Although the software supports the SNMP set capability for monitoring and troubleshooting the network, this support exposes no known security issues. (You can configure the software to disable this SNMP set capability.)
- The Junos OS ignores martian addresses that contain the following prefixes: 0.0.0.0/8, 127.0.0.0/8, 128.0.0.0/16, 191.255.0.0/16, 192.0.0.0/24, 223.255.55.0/24, and 240.0.0.0/4. Martian addresses are reserved host or network addresses about which all routing information should be ignored.

Junos OS Features for Router Security

Router security consists of three major elements: physical security of the router, operating system security, and security that can be effected through configuration. Physical security involves restricting access to the router. Exploits that can easily be prevented from remote locations are extremely difficult or impossible to prevent if an attacker can gain access to the router's management port or console. The inherent security of the Junos operating system also plays an important role in router security. The Junos OS is extremely stable

and robust. The Junos OS also provides features to protect against attacks, allowing you to configure the router to minimize vulnerabilities.

The following are Junos OS features available to improve router security:

- [Methods of Remote Access for Router Management on page 30](#)
- [Junos OS Supported Protocols and Methods for User Authentication on page 31](#)
- [Junos OS Plain-Text Password Requirements on page 31](#)
- [Junos OS Support for Routing Protocol Security Features and IPsec on page 32](#)
- [Junos OS Support for Firewall Filters on page 32](#)
- [Junos OS Auditing Support for Security on page 33](#)

Methods of Remote Access for Router Management

When you first install the Junos OS, all remote access to the router is disabled, thereby ensuring that remote access is possible only if deliberately enabled by an authorized user. You can establish remote communication with a router in one of the following ways:

- **Out-of-band management**—Enables connection to the router through an interface dedicated to router management. Juniper Networks routers support out-of-band management with a dedicated management Ethernet interface, as well as EIA-232 console and auxiliary ports. On all routers other than the TX Matrix Plus router, T1600 router, T1600 or T4000 routers connected to a TX Matrix Plus router in a routing matrix, T640 routers with a Routing Engine supporting 64-bit Junos OS, and PTX Series Transport Routers, the management interface is fxp0. On a TX Matrix Plus router, T1600 router, T1600 or T4000 routers in a routing matrix, T640 routers with a Routing Engine supporting 64-bit Junos OS, and PTX Series Transport Routers, the management Ethernet interface is labeled em0. The management Ethernet interface connects directly to the Routing Engine. No transit traffic is allowed through this interface, providing complete separation of customer and management traffic and ensuring that congestion or failures in the transit network do not affect the management of the router.
- **Inband management**—Enables connection to the routers using the same interfaces through which customer traffic flows. Although this approach is simple and requires no dedicated management resources, it has some disadvantages:
 - Management flows and transit traffic flows are mixed together. Any attack traffic that is mixed with the normal traffic can affect the communication with the router.
 - The links between router components might not be totally trustworthy, leading to the possibility of wiretapping and replay attacks.

For management access to the router, the standard ways to communicate with the router from a remote console are with Telnet and SSH. SSH provides secure encrypted communications and is therefore useful for inband router management. Telnet provides unencrypted, and therefore less secure, access to the router.

Junos OS Supported Protocols and Methods for User Authentication

On a router, you can create local user login accounts to control who can log in to the router and the access privileges they have. A password, either an SSH key or a Message Digest 5 (MD5) password, is associated with each login account. To define access privileges, you create login classes into which you group users with similar jobs or job functions. You use these classes to explicitly define what commands their users are and are not allowed to issue while logged in to the router.

The management of multiple routers by many different personnel can create a user account management problem. One solution is to use a central authentication service to simplify account management, creating and deleting user accounts only on a single, central server. A central authentication system also simplifies the use of one-time password systems such as SecureID, which offer protection against password sniffing and password replay attacks (attacks in which someone uses a captured password to pose as a router administrator).

The Junos OS supports two protocols for central authentication of users on multiple routers:

- Remote Authentication Dial-In User Service (RADIUS) and Terminal Access Controller Access Control System Plus (TACACS+).
- RADIUS, a multivendor IETF standard whose features are more widely accepted than those of TACACS+ or other proprietary systems. All one-time-password system vendors support RADIUS.

The Junos OS also supports the following authentication methods:

- Internet Protocol Security (IPsec). IPsec architecture provides a security suite for the IPv4 and IPv6 network layers. The suite provides such functionality as authentication of origin, data integrity, confidentiality, replay protection, and nonrepudiation of source. In addition to IPsec, the Junos OS also supports the Internet Key Exchange (IKE), which defines mechanisms for key generation and exchange, and manages security associations (SAs).
- MD5 authentication of MSDP peering sessions. This authentication provides protection against spoofed packets being introduced into a peering session.
- SNMPv3 authentication and encryption. SNMPv3 uses the user-based security model (USM) for message security and the view-based access control model (VACM) for access control. USM specifies authentication and encryption. VACM specifies access-control rules.

Junos OS Plain-Text Password Requirements

The Junos OS has special requirements when you create plain-text passwords on a router. The default requirements for plain-text passwords are as follows:

- The password must be between 6 and 128 characters long.

- You can include uppercase letters, lowercase letters, numbers, punctuation marks, and any of the following special characters:
! @ # \$ % ^ & * , + = < > ; ;
Control characters are not recommended.
- The password must contain at least one change of case or character class.

You can change the requirements for plain-text passwords.

You can include the **plain-text-password** statement at the following hierarchy levels:

- [edit system diag-port-authentication]
- [edit system pic-console-authentication]
- [edit system root-authentication]
- [edit system login user *username* authentication]

Junos OS Support for Routing Protocol Security Features and IPsec

The main task of a router is to forward user traffic toward its intended destination based on the information in the router's routing and forwarding tables. You can configure routing policies that define the flows of routing information through the network, controlling which routes the routing protocols place in the routing tables and which routes they advertise from the tables. You can also use routing policies to change specific route characteristics, change the BGP route flap-damping values, perform per-packet load balancing, and enable class of service (CoS).

Attackers can send forged protocol packets to a router with the intent of changing or corrupting the contents of its routing table or other databases, which can degrade the functionality of the router. To prevent such attacks, you must ensure that routers form routing protocol peering or neighboring relationships with trusted peers. One way to do this is by authenticating routing protocol messages. The Junos BGP, IS-IS, OSPF, RIP, and RSVP protocols support HMAC-MD5 authentication, which uses a secret key combined with the data being protected to compute a hash. When the protocols send messages, the computed hash is transmitted with the data. The receiver uses the matching key to validate the message hash.

The Junos OS supports the IPsec security suite for the IPv4 and IPv6 network layers. The suite provides such functionality as authentication of origin, data integrity, confidentiality, replay protection, and nonrepudiation of source. The Junos OS also supports IKE, which defines mechanisms for key generation and exchange, and manages SAs.

Junos OS Support for Firewall Filters

Firewall filters allow you to control packets transiting the router to a network destination and packets destined for and sent by the router. You can configure firewall filters to control which data packets are accepted on and transmitted from the physical interfaces, and which local packets are transmitted from the physical interfaces and the Routing Engine. Firewall filters provide a means of protecting your router from excessive traffic. Firewall filters that control local packets can also protect your router from external aggressions, such as DoS attacks.

To protect the Routing Engine, you can configure a firewall filter only on the router's loopback interface. Adding or modifying filters for each interface on the router is not necessary. You can design firewall filters to protect against ICMP and Transmission Control Protocol (TCP) connection request (SYN) floods and to rate-limit traffic being sent to the Routing Engine.

Junos OS Auditing Support for Security

The Junos OS logs significant events that occur on the router and within the network. Although logging itself does not increase security, you can use the system logs to monitor the effectiveness of your security policies and router configurations. You can also use the logs when reacting to a continued and deliberate attack as a means of identifying the source address, router, or port of the attacker's traffic. You can configure the logging of different levels of events, from only critical events to all events, including informational events. You can then inspect the contents of the system log files either in real time or later.

Debugging and troubleshooting are much easier when the timestamps in the system log files of all routers are synchronized, because events that span the network might be correlated with synchronous entries in multiple logs. The Junos OS supports the Network Time Protocol (NTP), which you can enable on the router to synchronize the system clocks of routers and other networking equipment. By default, NTP operates in an unauthenticated mode. You can configure various types of authentication, including an HMAC-MD5 scheme.

- Related Documentation**
- *IPsec Overview*
 - *Junos OS System Log Configuration Overview*

CHAPTER 3

Junos OS Configuration Overview

- [Methods for Configuring Junos OS on page 36](#)
- [Junos OS Configuration Using the CLI on page 39](#)
- [Creating and Activating a Candidate Configuration on page 39](#)
- [Format for Specifying IP Addresses, Network Masks, and Prefixes in Junos OS Configuration Statements on page 40](#)
- [Format for Specifying Filenames and URLs in Junos OS CLI Commands on page 40](#)
- [Default Directories for Junos OS File Storage on the Router or Switch on page 42](#)
- [Initial Router or Switch Configuration Using the Junos OS on page 43](#)

Methods for Configuring Junos OS

You can use any of the methods shown in [Table 6 on page 36](#) to configure Junos OS:

Table 6: Methods for Configuring Junos OS

Method	Description
Command-line interface (CLI)	Create the configuration for the device using the CLI. You can enter commands from a single command line, and scroll through recently executed commands.
ASCII file	Load an ASCII file containing a configuration that you created earlier, either on this system or on another system. You can then activate and run the configuration file, or you can edit it using the CLI and then activate it.
J-Web graphical user interface (GUI)	Use the J-Web graphical user interface (GUI) to configure the device. J-Web enables you to monitor, configure, troubleshoot, and manage the router on a client by means of a Web browser. The J-Web GUI is preinstalled on J Series Services Routers and is an optional software package that can be installed on M Series and T Series routers. J-Web is not available for the QFX Series.
Junos XML management protocol (API)	Use Junos XML protocol Perl client modules to develop custom applications for configuring information on devices that run Junos OS. Client applications use the Junos XML management protocol to request and change configuration information on Juniper Networks J Series, M Series, and T Series routers. The Junos XML management protocol is customized for Junos OS, and operations in the API are equivalent to those in the Junos OS CLI.
NETCONF application programming interface (API)	Use NETCONF Perl client modules to develop custom applications for configuring information on devices that run Junos OS. Client applications use the NETCONF XML management protocol to request and change configuration information on Juniper Networks J Series, M Series, and T Series routers. The NETCONF XML management protocol includes features that accommodate the configuration data models of multiple vendors.
Configuration commit scripts	Create scripts that run at commit time to enforce custom configuration rules. Commit scripts are written in Extensible Stylesheet Language Transformations (XSLT). Commit scripts are not available for the QFX Series.

The following sections contain complete descriptions of the methods you can use to configure Junos OS:

- [Junos OS Command-Line Interface \(CLI\) on page 37](#)
- [ASCII File on page 37](#)
- [J-Web Package on page 37](#)
- [Junos XML Management Protocol Software on page 38](#)

- [NETCONF XML Management Protocol Software on page 38](#)
- [Configuration Commit Scripts on page 38](#)

Junos OS Command-Line Interface (CLI)

The Junos OS CLI is a straightforward command interface. You use Emacs-style keyboard sequences to move around on a command line and scroll through a buffer that contains recently executed commands. You type commands on a single line, and the commands are executed when you press the Enter key. The CLI also provides command help and command completion. For more information about the CLI, see the *CLI User Guide* and *Junos OS Operational Mode Commands*.

ASCII File

You can load an ASCII file containing a configuration that you created earlier, either on this system or another system. You can then activate and run the configuration file as is, or you can edit it using the CLI and then activate it.

J-Web Package

As an alternative to entering CLI commands, the Junos OS supports the J-Web graphical user interface (GUI). The J-Web user interface enables you to monitor, configure, troubleshoot, and manage the router on a client by means of a Web browser with Hypertext Transfer Protocol (HTTP) or HTTP over Secure Sockets Layer (HTTPS) enabled.

The J-Web user interface is preinstalled on J Series Services Routers. It is provided as an optional, licensed software package (jweb package) on M Series and T Series routers. The jweb package is not included in jinstall and jbundle software bundles. It must be installed separately. To install the package on M Series and T Series routers, follow the procedure described in the *Installation and Upgrade Guide*.

J-Web supports weak (56-bit) encryption by default. This enables international customers to install J-Web and use HTTPS connections for J-Web access. Domestic customers can also install the jcrypto strong encryption package. This package automatically overrides the weak encryption. For more information about the J-Web GUI, see the *J-Web Interface User Guide*.



NOTE: Because the J-Web package is bundled separately from other packages, it is possible to have a version mismatch between J-Web and other Junos OS packages you have installed.

To check for a version mismatch, use the `show system alarms` CLI command. If the version number does not match exactly, a system alarm appears. For example, if you install the 7.4R1.2 jroute package and the 7.4R1.1 jweb package, an alarm is activated. For more information on the `show system alarms` command, see the *Junos OS Operational Mode Commands*.

Junos XML Management Protocol Software

The Junos XML management protocol is an Extensible Markup Language (XML) application that client applications use to request and change configuration information on Juniper Networks J Series, M Series, MX Series, and T Series routers. This API is customized for Junos OS, and operations in the API are equivalent to Junos OS CLI configuration mode commands. The Junos XML management protocol includes a set of Perl modules that enable client applications to communicate with a Junos XML protocol server on the router. The Perl modules are used to develop custom applications for configuring and monitoring Junos OS.

For a complete description of how to use Junos XML and Junos XML management protocol software, see the *Junos XML Management Protocol Guide*.

NETCONF XML Management Protocol Software

The NETCONF XML management protocol is an Extensible Markup Language (XML) application that client applications can use to request and change configuration information on Juniper Networks J Series, M Series, MX Series, and T Series routers. This API is customized for Junos OS, and includes features that accommodate the configuration data models of multiple vendors. The NETCONF XML management protocol includes a set of Perl modules that enable client applications to communicate with a NETCONF server on the router. The Perl modules are used to develop custom applications for configuring and monitoring Junos OS.

For a complete description of how to use Junos XML and NETCONF XML management protocol software, see the *NETCONF XML Management Protocol Developer Guide*.

Configuration Commit Scripts

You can create and use scripts that run at commit time to enforce custom configuration rules. If a configuration breaks the custom rules, the script can generate actions that the Junos OS performs. These actions include:

- Generating custom error messages
- Generating custom warning messages
- Generating custom system log messages
- Making changes to the configuration

Configuration commit scripts also enable you to create macros, which expand simplified custom aliases for frequently used configuration statements into standard Junos configuration statements. Commit scripts are written in Extensible Stylesheet Language Transformations (XSLT). For more information, see the *Junos OS Automation Library*.

Related Documentation

- [Junos OS Configuration from External Devices on page 25](#)

Junos OS Configuration Using the CLI

You configure the Junos OS using the Junos OS command-line interface (CLI). The CLI is described in detail in the *CLI User Guide*.

After completing the initial minimal configuration, you can configure software properties. If you configure the software interactively using the CLI, you enter software configuration statements to create a candidate configuration that contains a hierarchy of statements. At any hierarchy level, you generally can enter statements in any order. While you are configuring the software, you can display all or portions of the candidate configuration, and you can insert or delete statements. Any changes you make affect only the candidate configuration, not the active configuration that is running on the router.

The configuration hierarchy logically groups related functions, which results in configuration statements that have a consistent syntax. For example, you configure routing protocols, routing policies, interfaces, and SNMP management in their own separate portions of the configuration hierarchy.

At each level of the hierarchy, you can display a list of the statements available at that level, along with short descriptions of the statements' functions. To have the CLI complete the statement name if it is unambiguous or to provide a list of possible completions, you can type a partial statement name followed by a space or tab.

More than one user can edit a router's configuration simultaneously. All changes made by all users are visible to everyone editing the configuration.

Related Documentation

- [Disk Space Management for Junos OS Installation on page 92](#)
- [Creating and Activating a Candidate Configuration on page 39](#)

Creating and Activating a Candidate Configuration

You enter software configuration statements using the CLI to create a candidate configuration that contains a hierarchy of statements. To have a candidate configuration take effect, you commit the changes. At this point, the candidate file is checked for proper syntax, activated, and marked as the current, operational software configuration file. If multiple users are editing the configuration, when you commit the candidate configuration, all changes made by all the users take effect.

The CLI always maintains a copy of previously committed versions of the software configuration. If you need to return to a previous configuration, you can do this from within the CLI.

Related Documentation

- [Junos OS Commit Model for Router or Switch Configuration on page 9](#)

Format for Specifying IP Addresses, Network Masks, and Prefixes in Junos OS Configuration Statements

Many statements in the Junos OS configuration include an option to specify an IP address or route prefix. This option is represented in one of the following ways:

- **network/prefix-length**—Network portion of the IP address, followed by a slash and the destination prefix length (previously called the subnet mask). For example, 10.0.0.1/8.
- **network**—IP address. For example, 10.0.0.2.
- **destination-prefix/prefix-length**—Route prefix, followed by a slash and the destination prefix length. For example, 192.168.1.10/32.

You enter all IP addresses in classless mode. You can enter the IP address with or without a prefix length, in standard dotted notation (for example, 1.2.3.4), or hexadecimal notation as a 32-bit number in network-byte order (for example, 0x01020304). If you omit any octets, they are assumed to be zero. Specify the prefix length as a decimal number from 1 through 32.

Related Documentation

- [Format for Specifying Filenames and URLs in Junos OS CLI Commands on page 40](#)

Format for Specifying Filenames and URLs in Junos OS CLI Commands

In some command-line interface (CLI) commands and configuration statements—including **file copy**, **file archive**, **load**, **save**, **set system login user *username* authentication load-key-file**, and **request system software add**—you can include a filename. On a routing matrix, you can include chassis information (for example, **lcc0**, **lcc0-re0**, or **lcc0-re1**) as part of the filename.

A *routing matrix* is a multichassis architecture composed of either one TX Matrix router and from one to four T640 routers connected to the TX Matrix router, or one TX Matrix Plus router and from one to four T1600 routers connected to the TX Matrix Plus router. From the perspective of the user interface, the routing matrix appears as a single router. On a routing matrix composed of the TX Matrix router and T640 routers, the TX Matrix router controls all the T640 routers. On a routing matrix composed of a TX Matrix Plus router and T1600 routers, the TX Matrix Plus router controls all the T1600 routers.

You can specify a filename or URL in one of the following ways:

- **filename**—File in the user's current directory on the local CompactFlash card (not applicable on the QFX Series). You can use wildcards to specify multiple source files or a single destination file. Wildcards are not supported in Hypertext Transfer Protocol (HTTP) or FTP.



NOTE: Wildcards are supported only by the `file` (`compare` | `copy` | `delete` | `list` | `rename` | `show`) commands. When you issue the `file show` command with a wildcard, it must resolve to one filename.

- **path/filename**—File on the local flash disk.
- **/var/filename** or **/var/path/filename**—File on the local hard disk. You can also specify a file on a local Routing Engine for a specific T640 router or a T1600 router in a routing matrix:

```
user@host> file delete lcc0-re0:/var/tmp/junk
```

- **a:filename** or **a:path/filename**—File on the local removable media. The default path is `/` (the root-level directory). The removable media can be in MS-DOS or UNIX (UFS) format.
- **hostname:/path/filename**, **hostname:filename**, **hostname:path/filename**, or **"scp://hostname/path/filename"**—File on an `scp/ssh` client. This form is not available in the worldwide version of the Junos OS. The default path is the user's home directory on the remote system. You can also specify **hostname** as **username@hostname**.
- **ftp://hostname/path/filename**—File on an FTP server. You can also specify **hostname** as **username@hostname** or **username:password@hostname**. The default path is the user's home directory. To specify an absolute path, the path must start with `%2F`; for example, **ftp://hostname/%2Fpath/filename**. 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:

```
user@host> file copy ftp://username@ftp.hostname.net/filename
file copy ftp.hostname.net: Not logged in.
```

```
user@host> file copy ftp://username:prompt@ftp.hostname.net/filename
Password for username@ftp.hostname.net:
```

- **re0:/path/filename** or **re1:/path/filename**—File on a local Routing Engine. You can also specify a file on a local Routing Engine for a specific T640 router or a T1600 router in a routing matrix:

```
user@host> show log lcc0-re1:chassisd
```



NOTE: You cannot specify a URL for a file on a Hypertext Transfer Protocol (HTTP) server, because HTTP URLs are not writable.

Related Documentation

- [Format for Specifying IP Addresses, Network Masks, and Prefixes in Junos OS Configuration Statements on page 40](#)
- [Default Directories for Junos OS File Storage on the Router or Switch on page 42](#)

Default Directories for Junos OS File Storage on the Router or Switch

Junos OS files are stored in the following directories on the router or switch:

- **/altconfig**—When you back up the currently running and active file system partitions on the router or switch to standby partitions using the **request system snapshot** command, the **/config** directory is backed up to **/altconfig**. Normally, the **/config** directory is on the CompactFlash card and **/altconfig** is on the hard disk.
- **/altroot**—When you back up the currently running and active file system partitions on the router to standby partitions using the **request system snapshot** command, the root file system (**/**) is backed up to **/altroot**. Normally, the root directory is on the CompactFlash card and **/altroot** is on the hard disk.
- **/config**—This directory is located on the primary boot device, that is, on the device from which the router or switch booted (generally the CompactFlash card (device **wd0**) or internal flash storage. This directory contains the current operational router or switch configuration and the last three committed configurations, in the files **juniper.conf**, **juniper.conf.1**, **juniper.conf.2**, and **juniper.conf.3**, respectively.
- **/var**—This directory is located either on the hard disk (device **wd2**) or internal flash storage. It contains the following subdirectories:
 - **/home**—Contains users' home directories, which are created when you create user access accounts. For users using SSH authentication, their **.ssh** file, which contains their SSH key, is placed in their home directory. When a user saves or loads a configuration file, that file is loaded from the user's home directory unless the user specifies a full pathname.
 - **/db/config**—Contains up to 46 additional previous versions of committed configurations, which are stored in the files **juniper.conf.4.gz** through **juniper.conf.49.gz**.
 - **/log**—Contains system log and tracing files.
 - **/tmp**—Contains core files. The software saves up to five core files, numbered from 0 through 4. File number 0 is the oldest core file and file number 4 is the newest core file. To preserve the oldest core files, the software overwrites the newest core file, number 4, with any subsequent core file.

Each router or switch ships with removable media (device **wfd0**) that contains a backup copy of the Junos OS.

Directories on the Logical System

In addition to saving the configuration of logical systems in the current **juniper.conf** file, each logical system has an individual directory structure created in the **/var/logical-systems/logical-system-name** directory.

The **/var/logical-systems/logical-system-name** directory contains the following subdirectories:

- **/config**—Contains the current operational configuration specific to the logical system.

- **/log**—Contains system log and tracing files specific to the logical system.

To maintain backward compatibility for the log files with previous versions of Junos OS, a symbolic link (symlink) from the **/var/logs/logical-system-name** directory to the **/var/logical-systems/logical-system-name** directory is created when a logical system is configured.

- **/tmp**—Contains temporary files specific to the logical system.

This file system for each logical system enables logical system users to view trace logs and modify logical system files. Logical system administrators have full access to view and modify all files specific to the logical system.

Logical system users and administrators can save and load configuration files at the logical-system hierarchy level using the **save** and **load** configuration mode commands. In addition, they can also issue the **show log**, **monitor**, and **file** operational mode commands at the logical-system hierarchy level.

**Related
Documentation**

- [Format for Specifying Filenames and URLs in Junos OS CLI Commands on page 40](#)

Initial Router or Switch Configuration Using the Junos OS

This topic provides an overview of initial router or switch configuration tasks using the Junos OS.

When you turn on a router or switch for the first time, the Junos OS automatically boots and starts. You must enter basic configuration information so that the router or switch is on the network and you can log in to it over the network.

To configure the router or switch initially, you must connect a terminal or laptop computer to the router or switch through the console port—a serial port on the front of the router or switch. Only console access to the router or switch is enabled by default. Remote management access to the router or switch and all management access protocols, including Telnet, FTP, and SSH, are disabled by default.

When you first connect to the router or switch console, you must log in as the user **root**. At first, the root account requires no password. You see that you are the user **root**, because the command prompt shows the username **root@#**.

You must start the Junos OS command-line interface (CLI) using the command **cli**. The command prompt **root@>** indicates that you are the user **root** and that you are in the Junos OS operational mode. Enter the Junos OS configuration mode by typing the command **configure**. The command prompt **root@#** indicates that you are in the Junos OS configuration mode.

When you first configure a router or switch, you must configure the following basic properties:

- Router or switch hostname
- Domain name

- IP address of the router or switch management Ethernet interface—To find the management Ethernet interface that you should use for configuration, see *Supported Routing Engines by Chassis*.
- IP address of a backup router
- IP address of one or more DNS name servers on your network
- Password for the root account

**Related
Documentation**

- [Configuring Junos OS for the First Time on a Router or Switch with a Single Routing Engine on page 51](#)
- [Configuring Junos OS for the First Time on a Device with Dual Routing Engines on page 55](#)
- *Supported Routing Engines by Chassis*
- [Junos OS Configuration Using the CLI on page 39](#)

CHAPTER 4

Junos OS Monitoring Tools Overview

- [Junos OS Tools for Monitoring the Router on page 45](#)

Junos OS Tools for Monitoring the Router

The primary method of monitoring and troubleshooting the Junos OS, routing protocols, network connectivity, and the router hardware is to enter commands from the CLI. The CLI enables you to display information in the routing tables and routing protocol-specific data, and to check network connectivity using **ping** and **traceroute** commands.

The J-Web graphical user interface (GUI) is a Web-based alternative to using CLI commands to monitor, troubleshoot, and manage the router.

The Junos OS includes SNMP software, which enables you to manage routers. The SNMP software consists of an SNMP master agent and a MIB II agent, and supports MIB II SNMP version 1 traps and version 2 notifications, SNMP version 1 **Get** and **GetNext** requests, and version 2 **GetBulk** requests.

The software also supports tracing and logging operations so that you can track events that occur in the router—both normal router operations and error conditions—and track the packets that are generated by or pass through the router. Logging operations use a syslog-like mechanism to record system-wide, high-level operations, such as interfaces going up or down and users logging in to or out of the router. Tracing operations record more detailed messages about the operation of routing protocols, such as the various types of routing protocol packets sent and received, and routing policy actions.

Related Documentation

- [Methods for Configuring Junos OS on page 36](#)
- [Junos OS Features for Router Security on page 29](#)

PART 2

Configuration

- [Configuring Basic System Management Features on page 49](#)
- [Using Configuration Groups on page 95](#)
- [Junos Processes on page 113](#)
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CHAPTER 5

Configuring Basic System Management Features

- [Configuring CLI Tips on page 50](#)
- [Configuring Junos OS for the First Time on a Router or Switch with a Single Routing Engine on page 51](#)
- [Configuring Junos OS for the First Time on a Device with Dual Routing Engines on page 55](#)
- [Set Up Routing Engine Configuration Groups on page 60](#)
- [Configuring Basic Router or Switch Properties on page 61](#)
- [Configuring the Hostname of the Router or Switch on page 62](#)
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- [Configuring an ISO System Identifier for the Router on page 63](#)
- [Example: Configuring the Name of the Router, IP Address, and System ID on page 63](#)
- [Configuring the Domain Name for the Router or Switch on page 64](#)
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- [Configuring Automatic Mirroring of the CompactFlash Card on the Hard Disk Drive on page 71](#)
- [Using Junos OS to Specify the Number of Configurations Stored on the CompactFlash Card on page 72](#)
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- [Configuring the Junos OS to Make the Router or Interface Act as a DHCP or BOOTP Relay Agent on page 86](#)
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- [Disk Space Management for Junos OS Installation on page 92](#)

Configuring CLI Tips

The Junos OS CLI provides the option of configuring CLI tips for the user. By default, the **tip** command is not enabled when a user logs in.

- To enable tips, include the **login-tip** statement at the **[edit system login class *class-name*]** hierarchy level:

```
[edit system login class class-name]  
login-tip;
```

Adding this statement enables the **tip** command for the class specified, provided the user logs in using the CLI.

Related Documentation

- [CLI User Interface Overview](#)
- [Defining Junos OS Login Classes](#)
- [login-tip](#)

Configuring Junos OS for the First Time on a Router or Switch with a Single Routing Engine

When you turn on a router the first time, Junos OS automatically boots and starts. You must enter basic configuration information so that the router is on the network and you can log in to it over the network.

To configure the router initially, you must connect a terminal or laptop computer to the router through the console port—a serial port on the front of the router. Only console access to the router is enabled by default. Remote management access to the router and all management access protocols, including Telnet, FTP, and SSH, are disabled by default.

To configure the Junos OS for the first time on a router with a single Routing Engine, follow these steps:

1. Connect a terminal or laptop computer to the router through the console port—a serial port on the front of the router. Only console access to the router is enabled by default.
2. Power on the router and wait for it to boot.

The Junos OS boots automatically. The boot process is complete when you see the **login:** prompt on the console.

3. Log in as the user **root**.

Initially, the **root** user account requires no password. You can see that you are the **root** user, because the prompt on the router shows the username **root@#**.

4. Start the Junos OS command-line interface (CLI):

```
root@# cli
root@>
```

5. Enter Junos OS configuration mode:

```
cli> configure
[edit]
root@#
```

6. Configure the name of the router (the router hostname). We do not recommend spaces in the router name. However, if the name does include spaces, enclose the entire name in quotation marks (" ").

```
[edit]
root@# set system host-name hostname
```

7. Configure the router's domain name:

```
[edit]
root@# set system domain-name domain-name
```



NOTE: Before you begin Step 8, see *Supported Routing Engines by Chassis* to find the management Ethernet interface that you should use to perform this configuration.

8. Configure the IP address and prefix length for the router management Ethernet interface. The management Ethernet interface provides a separate out-of-band management network for the router.

- For devices that use management Ethernet interface fxp0:

```
[edit]
root@# set interfaces fxp0 unit 0 family inet address address/prefix-length
```

- For devices that use management Ethernet interface em0:

```
[edit]
root@# set interfaces em0 unit 0 family inet address address/prefix-length
```

To use em0 as an out-of-band management Ethernet interface, you must configure its logical port, em0.0, with a valid IP address.

9. Configure the IP address of a backup or default router. This device is called the backup router, because it is used only while the routing protocol process is not running. Choose a router that is directly connected to the local router by way of the management interface. The router uses this backup router only when it is booting and only when the Junos routing software (the routing protocol process, rpd) is not running.

For routers with two Routing Engines, the backup Routing Engine, **RE1**, uses the backup router as a default gateway after the router boots. This enables you to access the backup Routing Engine. (**RE0** is the default master Routing Engine.)



NOTE: The backup router Routing Engine does not support more than 16 destinations. If you configure more than 16 destinations on the backup Routing Engine, the Junos OS ignores any destination addresses after the sixteenth address and displays a commit-time warning message to this effect.

```
[edit]
root@# set system backup-router address
```

10. Configure the IP address of a DNS server. The router uses the DNS name server to translate hostnames into IP addresses.

```
[edit]
root@# set system name-server address
```

11. Set the root password, entering either a clear-text password that the system will encrypt, a password that is already encrypted, or an SSH public key string.

Choose one of the following:

- a. To enter a clear-text password, use the following command:

```
[edit]
root@# set system root-authentication plain-text-password
New password: type password
Retype new password: retype password
```

- b. To enter a password that is already encrypted, use the following command:

```
[edit]
```

```
root@# set system root-authentication encrypted-password encrypted-password
```

- c. To enter an SSH public key, use the following command:

```
[edit]
root@# set system root-authentication ssh-rsa key
```

12. Optionally, display the configuration statements:

```
[edit]
root@ show
system {
  host-name hostname;
  domain-name domain.name;
  backup-router address;
  root-authentication {
    (encrypted-password "password" | public-key);
    ssh-dsa "public-key";
    ssh-ecdsa "public-key";
    ssh-rsa "public-key";
  }
  name-server {
    address;
  }
  interfaces {
    fxp0 {
      unit 0 {
        family inet {
          address address;
        }
      }
    }
  }
}
```

On routers that use management Ethernet interface em0, you will see em0 in place of fxp0 in the **show** command output.

13. Commit the configuration, which activates the configuration on the router:

```
[edit]
root@# commit
```

After committing the configuration, you see the newly configured hostname appear after the username in the prompt—for example, **user@host#**.

The defaults for Junos OS are now set on the router.

If you want to configure additional Junos OS properties at this time, remain in the CLI configuration mode and add the necessary configuration statements. You need to commit your configuration changes to activate them on the router.

14. Exit from the CLI configuration mode.

```
[edit]
root@hostname# exit
root@hostname>
```

15. Back up the configuration on the hard drive.

After you have installed the software on the router, committed the configuration, and are satisfied that the new configuration is successfully running, you should issue the **request system snapshot** command to back up the new software to the **/altconfig** file system. If you do not issue the **request system snapshot** command, the configuration on the alternate boot device will be out of sync with the configuration on the primary boot device.

The **request system snapshot** command causes the root file system to be backed up to **/altroot**, and **/config** to be backed up to **/altconfig**. The root and **/config** file systems are on the router's CompactFlash card, and the **/altroot** and **/altconfig** file systems are on the router's hard disk.



NOTE: After you issue the **request system snapshot** command, you cannot return to the previous version of the software, because the running copy and the backup copy of the software are identical.

Related Documentation

- [Initial Router or Switch Configuration Using the Junos OS on page 43](#)
- [Supported Routing Engines by Chassis](#)
- [Format for Specifying IP Addresses, Network Masks, and Prefixes in Junos OS Configuration Statements on page 40](#)
- [Default Directories for Junos OS File Storage on the Router or Switch on page 42](#)
- [Configuring Basic Router or Switch Properties on page 61](#)
- [Configuring Automatic Mirroring of the CompactFlash Card on the Hard Disk Drive on page 71](#)

Configuring Junos OS for the First Time on a Device with Dual Routing Engines

If a router has dual Routing Engines, you can create configuration groups and use the same configuration for both Routing Engines. This ensures that the configuration will not change during a failover scenario because of the identical configuration shared between the Routing Engines.

Configure the hostnames and addresses of the two Routing Engines using configuration groups at the **[edit groups]** hierarchy level. Use the reserved configuration group **re0** for the Routing Engine in slot 0 and **re1** for the Routing Engine in slot 1 to define Routing Engine-specific parameters. Configuring **re0** and **re1** groups enables both Routing Engines to use the same configuration file.

Use the **apply-groups** statement to reproduce the configuration group information in the main part of the configuration.

The **commit synchronize** command commits the same configuration on both Routing Engines. The command makes the active or applied configuration the same for both Routing Engines with the exception of the groups, **re0** being applied to only **RE0** and **re1** being applied only to **RE1**. If you do not synchronize the configurations between two Routing Engines and one of them fails, the router may not forward traffic correctly, because the backup Routing Engine may have a different configuration.

To initially configure a router with dual Routing Engines, follow these steps:

1. Go to [“Configuring Junos OS for the First Time on a Router or Switch with a Single Routing Engine” on page 51](#) and follow Step 1 through Step 5 to initially configure the backup Routing Engine.
2. Create the configuration group **re0**. The **re0** group is a special group designator that is only used by **RE0** in a redundant routing platform.

```
[edit]
root@host# set groups re0
```

3. Navigate to the **groups re0** level of the configuration hierarchy.

```
[edit]
root@host# edit groups re0
```

4. Specify the router hostname.

```
[edit groups re0]
root@host# set system host-name host-name
```



NOTE: The hostname specified in the router configuration is not used by the DNS server to resolve to the correct IP address. This hostname is used to display the name of the Routing Engine in the CLI. For example, the hostname appears at the command-line prompt when the user is logged in to the CLI:

```
user-name@host-name>
```



NOTE: Before you begin Step 5, see *Supported Routing Engines by Chassis* to find the management Ethernet interface that you should use to perform this configuration.

5. Configure the IP address and prefix length for the router management Ethernet interface. The management Ethernet interface provides a separate out-of-band management network for the router.

- For routers that use management Ethernet interface fxp0:

```
[edit groups]
root@host# set interfaces fxp0 unit 0 family inet address address/prefix-length
```

- For routers that use management Ethernet interface em0:

```
[edit groups]
root@host# set interfaces em0 unit 0 family inet address address/prefix-length
```

To use em0 as an out-of-band management Ethernet interface, you must configure its logical port, em0.0, with a valid IP address.

6. Set the loopback interface address for the **re0** configuration group:

```
[edit groups]
root@host# set re0 interfaces lo0 unit 0 family inet address address/prefix-length
```

7. Return to the top level of the hierarchy.

```
[edit groups re0]
root@host# top
```

8. Create the configuration group **re1**.

```
[edit]
root@host# set groups re1
```

9. Navigate to the **groups re1** level of the configuration hierarchy.

```
[edit]
root@host# edit groups re1
```

10. Specify the router hostname.

```
[edit groups re1]
root@host# set system host-name host-name
```



NOTE: Before you begin Step 11, see *Supported Routing Engines by Chassis* to find the management Ethernet interface that you should use to perform this configuration.

11. Configure the IP address and prefix length for the router management Ethernet interface.

- For routers that use management Ethernet interface fxp0:

```
[edit groups]
root@host# set interfaces fxp0 unit 0 family inet address address/prefix-length
```

- For routers that use management Ethernet interface em0:

```
[edit groups]
root@host# set interfaces em0 unit 0 family inet address address/prefix-length
```

To use em0 as an out-of-band management Ethernet interface, you must configure its logical port, em0.0, with a valid IP address.

12. Set the loopback interface address for **re1** configuration group:

```
[edit groups]
root@host# set re1 interfaces lo0 unit 0 family inet address address/prefix-length
```

13. Return to the top level of the hierarchy.

```
[edit groups re0]
root@host# top
```

14. Configure the **apply-groups** statement to reproduce the configuration group information to the main part of the configuration and to specify the group application order.

```
[edit]
root@host# set apply-groups [ re0 re1 ]
```

15. Configure Routing Engine redundancy:

```
[edit]
root@host# set chassis redundancy routing-engine 0 master
root@host# set chassis redundancy routing-engine 1 backup
```

16. Save the configuration change on both Routing Engines:

```
[edit]
user@host> commit synchronize
```

After the configuration changes are saved, complete the management console configuration.

1. Configure the IP address of the DNS server.

```
[edit ]
root@host# set system name-server address
```

2. Configure the router domain name:

```
[edit ]
root@host# set system domain-name domain-name
```

3. Configure the IP address of a backup or default router. A backup router is used only while the routing protocol process is not running. Choose a router that is directly connected to the local router by way of the management interface. The router uses this backup router only when it is booting and or when the Junos routing software (the routing protocol process, rpd) is not running. For more information, see [“Configuring a Backup Router” on page 69](#).

For routers with two Routing Engines, the backup Routing Engine, **RE1**, uses the backup router as a default gateway after the router boots. This enables you to access the backup Routing Engine. (**RE0** is the default master Routing Engine.)



NOTE: The backup router Routing Engine does not support more than 16 destinations. If you configure more than 16 destinations on the backup Routing Engine, the Junos OS ignores any destination addresses after the sixteenth address and displays a commit-time warning message to this effect.

[edit]

```
root@host# set system backup-router address
```

4. Set the root password by choosing one of the following:

- a. To enter a clear-text password, use the following command:

[edit]

```
root@host# set system root-authentication plain-text-password
```

```
New password: type password
```

```
Retype new password: retype password
```

- b. To enter a password that is already encrypted, use the following command:

[edit]

```
root@host# set system root-authentication encrypted-password
```

```
encrypted-password
```

- c. To enter an SSH public key, use the following command:

[edit]

```
root@host# set system root-authentication ssh-rsa key
```

5. Optionally, display the configuration statements:

[edit]

```
root@ show
```

```
system {
```

```
  host-name hostname;
```

```
  domain-name domain.name;
```

```
  backup-router address;
```

```
  root-authentication {
```

```
    (encrypted-password "password" | public-key);
```

```
    ssh-dsa "public-key";
```

```
    ssh-ecdsa "public-key";
```

```
    ssh-rsa "public-key";
```

```
  }
```

```
  name-server {
```

```
    address;
```

```
  }
```

```
  interfaces {
```

```
    fxp0 {
```

```
      unit 0 {
```

```
        family inet {
```

```
          address address ;
```

```
        }
```

```
      }
```

```
    }
```

```
  }
```

```
}
```

On routers that use management Ethernet interface em0, you will see em0 in place of fxp0 in the **show** command output.

6. After you have installed the new software and are satisfied that it is successfully running, issue the **request system snapshot** command to back up the new software on both master and backup Routing Engines.

```
{master}
user@host> request system snapshot
```

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 CompactFlash card, and the **/altroot** and **/altconfig** file systems are on the router's hard disk.



NOTE: After you issue the **request system snapshot** command, you cannot return to the previous version of the software, because the running copy and backup copy of the software are identical.

For information about creating configuration groups, see *CLI User Guide*.

For information about configuring high availability features for redundant Routing Engine systems and the **re0** group, see *Junos OS High Availability Library for Routing Devices*.

Related Documentation

- [Configuring Junos OS for the First Time on a Router or Switch with a Single Routing Engine on page 51](#)
- [Supported Routing Engines by Chassis](#)
- [Initial Router or Switch Configuration Using the Junos OS on page 43](#)
- [Format for Specifying IP Addresses, Network Masks, and Prefixes in Junos OS Configuration Statements on page 40](#)
- [Default Directories for Junos OS File Storage on the Router or Switch on page 42](#)
- [Configuring Basic Router or Switch Properties on page 61](#)
- [Configuring Automatic Mirroring of the CompactFlash Card on the Hard Disk Drive on page 71](#)

Set Up Routing Engine Configuration Groups

In a router with two Routing Engines, one configuration should be shared between both Routing Engines. This ensures that both Routing Engine configurations are identical. Within this configuration, create two Routing Engine groups, one for each Routing Engine. Within these groups, you specify the Routing Engine–specific parameters.

For more information about creating configuration groups, see *CLI User Guide*.

For more information about the initial configuration for redundant Routing Engine systems and the re0 group, see *Junos OS High Availability Configuration Guide*.

1. Create the configuration group **re0**. The **re0** group is a special group designator that is only used by **RE0** in a redundant routing platform.

```
[edit]
root# set groups re0
```

2. Navigate to the **groups re0** level of the configuration hierarchy.

```
[edit]
root# edit groups re0
```

3. Specify the router hostname.

```
[edit groups re0]
root# set system host-name host-name
```



NOTE: The hostname specified in the router configuration is not used by the DNS server to resolve to the correct IP address. This hostname is used to display the name of the Routing Engine in the CLI. For example, the hostname appears at the command-line prompt when the user is logged in to the CLI:

```
user-name@host-name>
```

4. Configure the IP address and prefix length for the router Ethernet interface.
 - For all devices *except* the TX Matrix Plus router, T1600 or T4000 routers in a routing matrix, and PTX Series Packet Transport Routers:

```
[edit]
root@# set interfaces fxp0 unit 0 family inet address address/prefix-length
```

- For TX Matrix Plus router, and T1600 or T4000 routers in a routing matrix only, and PTX Series Packet Transport Routers:

```
[edit]
root@# set interfaces em0 unit 0 family inet address address/prefix-length
```

To use **em0** as an out-of-band management Ethernet interface, you must configure its logical port, **em0.0**, with a valid IP address.

- For a T1600 standalone router (not connected to a TX Matrix Plus router and not in a routing matrix):

```
[edit]
root@# set interfaces fxp0 unit 0 family inet address address/prefix-length
```

5. Return to the top level of the hierarchy.

```
[edit groups re0]
root# top
```

6. Create the configuration group **re1**.

```
[edit]
root# set groups re1
```

7. Navigate to the **groups re1** level of the configuration hierarchy.

```
[edit]
root# edit groups re1
```

8. Specify the router hostname.

```
[edit groups re1]
root# set system host-name host-name
```

9. Configure the IP address and prefix length for the router Ethernet interface.

- For all devices *except* the TX Matrix Plus router, T1600 or T4000 routers in a routing matrix, and PTX Series Packet Transport Routers:

```
[edit]
root@# set interfaces fxp0 unit 0 family inet address address/prefix-length
```

- For TX Matrix Plus router, and T1600 or T4000 routers in a routing matrix only:

```
[edit]
root@# set interfaces em0 unit 0 family inet address address/prefix-length
```

To use **em0** as an out-of-band management Ethernet interface, you must configure its logical port, **em0.0**, with a valid IP address.

- For a T1600 standalone router (not connected to a TX Matrix Plus router, and not in a routing matrix):

```
[edit]
root@# set interfaces fxp0 unit 0 family inet address address/prefix-length
```

10. Return to the top level of the hierarchy.

```
[edit groups re0]
root# top
```

11. Specify the group application order.

```
[edit]
root# set apply-groups [ re0 re1 ]
```

Configuring Basic Router or Switch Properties

When you configure the router initially, you must configure the basic properties of a router, such as the router's hostname, IP addresses, and the name of the domain in which the router is located.

To configure basic router properties:

1. Configure the router's hostname.
See [“Configuring the Hostname of the Router or Switch” on page 62](#)
2. Map the router's hostname to IP addresses.
See [“Mapping the Name of the Router to IP Addresses” on page 62](#).
3. Configure an ISO system identifier for the router.
See [“Configuring an ISO System Identifier for the Router” on page 63](#).
4. Configure the router's domain name.
See [“Configuring the Domain Name for the Router or Switch” on page 64](#).

**Related
Documentation**

- [Example: Configuring the Name of the Router, IP Address, and System ID on page 63](#)
- [Configuring Junos OS for the First Time on a Router or Switch with a Single Routing Engine on page 51](#)
- [Configuring Junos OS for the First Time on a Device with Dual Routing Engines on page 55](#)
- [Configuring the Physical Location of the Router or Switch on page 75](#)
- [Configuring a Backup Router on page 69](#)

Configuring the Hostname of the Router or Switch

To configure the name of the router or switch, include the **host-name** statement at the **[edit system]** hierarchy level:

```
[edit system]  
host-name hostname;
```

The name value must be less than 256 characters.

**Related
Documentation**

- [Example: Configuring the Name of the Router, IP Address, and System ID on page 63](#)
- [Example: Configuring the Name of the Switch, IP Address, and System ID](#)
- [Configuring Basic Router or Switch Properties on page 61](#)
- [Mapping the Hostname of the Switch to IP Addresses](#)
- [host-name](#)

Mapping the Name of the Router to IP Addresses

To map a router's hostname to one or more IP addresses, include the **inet** statement at the **[edit system static-host-mapping hostname]** hierarchy level:

```
[edit system]  
static-host-mapping {
```



```

hostname {
  inet [ addresses ];
  alias [ aliases ];
}

```

hostname is the name specified by the **host-name** statement at the **[edit system]** hierarchy level.

For each host, you can specify one or more aliases.

Related Documentation

- [Configuring Basic Router or Switch Properties on page 61](#)
- [Example: Configuring the Name of the Router, IP Address, and System ID on page 63](#)
- [Configuring the Domain Name for the Router or Switch on page 64](#)

Configuring an ISO System Identifier for the Router

For IS-IS to operate on the router, you must configure a system identifier (system ID). The system identifier is commonly the media access control (MAC) address or the IP address expressed in binary-coded decimal (BCD).

To configure an International Organization for Standardization (ISO) system ID, include the **sysid** statement at the **[edit system static-host-mapping hostname]** hierarchy level:

```

[edit system]
static-host-mapping {
  hostname {
    sysid system-identifier;
  }
}

```

hostname is the name specified by the **host-name** statement at the **[edit system]** hierarchy level.

system-identifier is the ISO system identifier. It is the 6-byte system ID portion of the IS-IS network service access point (NSAP). We recommend that you use the host's IP address represented in BCD format. For example, the IP address 192.168.1.77 is 1921.6800.1077 in BCD.

Related Documentation

- [Configuring Basic Router or Switch Properties on page 61](#)
- [Example: Configuring the Name of the Router, IP Address, and System ID on page 63](#)

Example: Configuring the Name of the Router, IP Address, and System ID

The following example shows how to configure the router's name, map the name to an IP address and alias, and configure a system identifier:

```

[edit]
user@host# set system host-name router-sjl
[edit]
user@host# set system static-host-mapping router-sjl inet 192.168.1.77

```

```
[edit]
user@host# set system static-host-mapping router-sjl alias sjl
[edit]
user@host# set system static-host-mapping router-sjl sysid 1921.6800.1077
[edit]
user@host# show
system {
  host-name router-sjl;
  static-host-mapping {
    router-sjl {
      inet 192.168.1.77;
      alias sjl;
      sysid 1921.6800.1077;
    }
  }
}
```

Related Documentation

- [Configuring Basic Router or Switch Properties on page 61](#)

Configuring the Domain Name for the Router or Switch

For each router or switch, you should configure the name of the domain in which the router or switch is located. This is the default domain name that is appended to hostnames that are not fully qualified.

To configure the domain name, include the **domain-name** statement at the **[edit system]** hierarchy level:

```
[edit system]
domain-name domain-name;
```

The following example shows how to configure the domain name:

```
[edit]
user@host# set system domain-name company.net
[edit]
user@host# show
system {
  domain-name company.net;
}
```

Related Documentation

- [domain-name on page 138](#)
- *domain-name*
- [Example: Configuring the Domain Name for the Router or Switch on page 64](#)

Example: Configuring the Domain Name for the Router or Switch

The following example shows how to configure the router or switch domain name:

```
[edit]
user@host# set system domain-name company.net
[edit]
```

```

user@host# show
system {
    domain-name company.net;
}

```

- Related Documentation**
- *domain-name*
 - [Configuring the Domain Name for the Router or Switch on page 64](#)

Configuring the Domains to Search When a Router or Switch Is Included in Multiple Domains

If your router or switch is included in several different domains, you can configure those domain names to be searched.

To configure more than one domain to be searched, include the **domain-search** statement at the **[edit system]** hierarchy level:

```

[edit system]
domain-search [ domain-list ];

```

The domain list can contain up to six domain names, with a total of up to 256 characters.

The following example shows how to configure two domains to be searched:

```

[edit system]
domain-search [ domainone.net domainonealternate.com ]

```

- Related Documentation**
- [Example: Configuring the Domain Name for the Router or Switch on page 64](#)
 - [Configuring a DNS Name Server for Resolving a Hostname into Addresses on page 65](#)
- Configuring a DNS Name Server for Resolving a Hostname into Addresses*

Configuring a DNS Name Server for Resolving a Hostname into Addresses

To have the router or switch resolve hostnames into addresses, you must configure a maximum of three Domain Name System (DNS) name servers by including the **name-server** statement at the **[edit system]** hierarchy level:

```

[edit system]
name-server {
    address;
}

```

The following example shows how to configure two DNS name servers:

```

[edit]
user@host# set system name-server 192.168.1.253
[edit]
user@host# set system name-server 192.168.1.254
[edit]
user@host# show
system {
    name server {

```

```

192.168.1.253;
192.168.1.254;
}
}

```

Related Documentation

- [Configuring the Domains to Search When a Router or Switch Is Included in Multiple Domains on page 65](#)
- [name-server on page 152](#)

Example: Configuring a Proxy Server for License Updates

- [Requirements on page 66](#)
- [Overview on page 66](#)
- [Configuration on page 67](#)
- [Verification on page 68](#)

Requirements

This example uses the following hardware and software components:

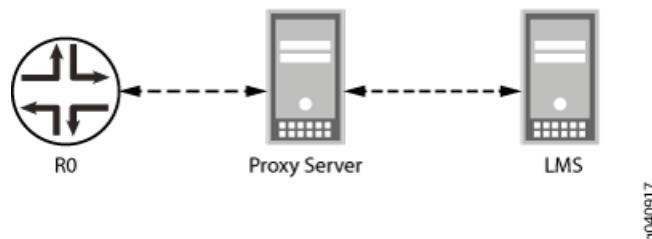
- An M Series, MX Series, PTX Series, SRX Series device
- Junos OS Release 11.4 running on the device

Overview

In Junos OS Release 11.4 and later, you can download Juniper Networks license updates using a proxy server. This feature is supported on M Series and SRX Series devices. In earlier releases, downloading license updates was only possible by directly connecting to the [Juniper Networks License Management System](#).

In an enterprise, there might be devices in a private network that might be restricted from connecting to the Internet directly for security reasons. In such scenarios, you can configure a proxy server in the private network to connect to the LMS and download the license updates, and have the routers or devices in the private network connect to the proxy server to download the licenses or license updates. In [Figure 2 on page 66](#), R0 is the router in the private network. P represents the proxy server and LMS represents the Juniper Networks License Management System.

Figure 2: Proxy Server Example



To enable this feature, you configure the device with details of the proxy server at the **[edit system proxy]** hierarchy level.

Configuration

CLI Quick Configuration To quickly configure this example, copy the following commands, paste them into a text file, remove any line breaks, change any details necessary to match your network configuration, and then copy and paste the commands into the CLI at the **[edit]** hierarchy level.

Router R0

```
set system proxy server 192.168.1.10
set system proxy port 3128
set system proxy username user1
set system proxy password user123
set system license traceoptions file license.log
set system license traceoptions flag all
```

Step-by-Step Procedure The following example requires you to navigate various levels in the configuration hierarchy. For information about navigating the CLI, see the *CLI User Guide*.

To configure the proxy server properties on the device:

1. Configure the proxy server IP address or hostname.

```
[edit system proxy]
user@hostR0# set server 192.168.1.10
```
2. Configure a port number (ranging from 0 through 65535) used to connect to the proxy server.

```
[edit system proxy]
user@hostR0# set port 3128
```
3. Configure the password as configured on the proxy server.

```
[edit system proxy]
user@R0# set password user123
```
4. Configure the username as configured on the proxy server.

```
[edit system proxy]
user@R0# set username user1
```
5. Configure trace options for licenses.

```
[edit system license]
user@R0# set traceoptions file license.log
user@R0# set traceoptions flag all
```

Results From configuration mode, confirm your configuration by entering the **show system** command. If the output does not display the intended configuration, repeat the instructions in this example to correct the configuration.

```
user@R0# show system
proxy {
  server 192.168.1.10;
  port 3128;
  username user1;
```

```

    password "$9$nLHU/tOB1hyeMIEMl7V4okqm"; ## SECRET-DATA
  }
  license {
    traceoptions {
      file license.log;
      flag all;
    }
  }
}

```

If you are done configuring the router, enter **commit** from configuration mode.

Verification

Confirm that the configuration is working properly.

Verifying That the License Is Downloaded

Purpose Verify that the license is downloaded using the proxy server.

Action 1. Delete the existing license using the **request system license delete license-filename** command.

2. Download the license using the **request system license update** command.

```
user@R0> request system license update
```

Request to automatically update license keys from <https://ae1.juniper.net> has been sent, use 'show system license' to check status.

3. Verify the license using the **show system license** command.

```
user@R0> show system license
```

License usage:

Feature name	Licenses used	Licenses installed	Licenses needed	Expiry
av_key_kaspersky_engine	0	1	0	
2011-11-17 16:00:00 PST				
idp-sig	1	1	0	
2011-11-17 16:00:00 PST				
ax411-wlan-ap	0	2	0	permanent

Licenses installed:

License identifier: JUNOS282725

License version: 2

Valid for device: AG2909AA0014

Features:

av_key_kaspersky_engine - Kaspersky AV

date-based, 2010-11-21 16:00:00 PST - 2011-11-17 16:00:00 PST

4. Check the system log file to verify that the license is downloaded using the proxy server.

```
user@R0> show /var/log/license.log
```

Nov 18 08:14:14 Received SIGHUP signal

Nov 18 08:14:17 GRES not enabled.

Nov 18 08:14:17 License download proxy server configured.

Nov 18 08:14:17 License download proxy server: 192.168.1.10

Nov 18 08:14:17 License download proxy server port: 3128

Nov 18 08:14:17 License download proxy user name: user1

```

Nov 18 08:14:17 License download proxy user password: xxx
Nov 18 08:14:18 Access configuration autoupdate url: ae1.juniper.net
Nov 18 08:14:18 Access configuration renew-before-expiration: 60 days
Nov 18 08:14:18 Access configuration renew-interval: 1 hours
Nov 18 08:16:53 Received SIGUSR1 signal, license download start...
Nov 18 08:16:58 env HTTP_PROXY=http://192.168.1.10/
Nov 18 08:16:58 env HTTP_PROXY_AUTH="basic*:abc:xxx"
HTTP_PROXY_AUTH="basic*:regress:MaRtInI" /usr/sbin/license_fetch -o
/tmp/license.keys.1053
'https://ae1.juniper.net/junos/key_retrieval?serial=AG2909AA0014=11.4I'
2> /tmp/license.status.1053
Nov 18 08:17:03 /tmp/license.keys.1053                    505 kB
505 kbps

```

- Related Documentation
- [password \(Proxy Systems\) on page 153](#)
 - [port on page 156](#)
 - [proxy on page 160](#)
 - [server on page 165](#)
 - [username on page 171](#)

Configuring a Backup Router

When a router or switch is booting, the routing protocol process (rpd) is not running; therefore, the router or switch has no static or default routes. To ensure the router or switch is reachable over the network while it boots or if the rpd fails to start properly, configure a backup router (running IP version 4 [IPv4] or IP version 6 [IPv6]), which is a router that is directly connected to the local router or switch (that is, on the same subnet) through its private management interface (e.g., fpx0).

By default, all hosts (default route) are reachable through the backup router. To achieve network reachability while loading, configuring, and recovering the router or switch, but without installing a default route in the forwarding table, include the **destination** option, specifying an address that is reachable through the backup router. Specify the address in the format **network/mask-length** so that the entire network is reachable through the backup router.

Any destinations defined by the backup router are not visible in the routing table, they are only visible in the local forwarding table when rpd is not running. Therefore, a recommended best practice is to also include the destinations of the backup router configured as static routes with the retain flag at the **[edit routing-options]** hierarchy level. The retain flag is necessary to allow the static route to remain in the forwarding table when rpd stops running, because the routing table does not exist if rpd is not running.

On systems with dual redundant Routing Engines, the backup Routing Engine's reachability through the private management interface is based only on the functionality of the **backup-router** configuration, it is not based on whether the rpd is running. The backup router adds the destination prefix upon bootup, whereas configuring a static route requires rpd to run first before installing the destination prefix. If rpd is allowed to run on the backup

Routing Engine, then a destination can be added in the routing table and the forwarding table by configuring static route with retain.



NOTE: Due to a system limitation, do not configure the destination address specified in the backup-router as '0.0.0.0/0' or ':::0'. The mask has to be a non-zero value.

Active routes and more specific routes take precedence over destination prefixes defined with the backup-router statement.

The following topics describe how to configure a backup router running IPv4 and IPv6, respectively:

1. [Configuring a Backup Router Running IPv4 on page 70](#)
2. [Configuring a Backup Router Running IPv6 on page 71](#)

Configuring a Backup Router Running IPv4

To configure a backup router running IPv4, include the **backup-router** statement at the **[edit system]** hierarchy level:

```
[edit system]
backup-router address <destination destination-address>;
```



NOTE: The Routing Engine on the backup router only supports 16 destination addresses. If you configure more than 16 destination addresses, the Junos OS ignores destination addresses after the sixteenth address and displays a commit-time warning message to this effect.

The address defined in the **backup-router** statement is not installed into the routing table, it is only installed to the forwarding table. To install the destination address definition in the routing table, you can also configure a static route with the same destination configuration as the backup-router. Both the backup-router and the static route will install the destination address into the forwarding table, however, because using only a static route requires rpd to run, the preferred method is to use the backup-router configuration.

Use this example to configure a backup router running IPv4 and have its address remain in the routing and forwarding tables:

```
[edit]
system {
  backup-router 192.168.1.254 destination 208.197.1.0/24;
}
routing-options {
  static {
    route 208.197.1.0/24 {
      next-hop 192.168.1.254;
      retain;
    }
  }
}
```



```
}
```

Configuring a Backup Router Running IPv6

To configure a backup router running IPv6, include the **inet6-backup-router** statement at the **[edit system]** hierarchy level:

```
[edit system]
  inet6-backup-router "address <destination destination-address>;"
```

The following example shows how to configure a backup router running IPv6 and have its address remain in the routing and forwarding tables:

```
[edit]
system {
  inet6-backup-router 8:3::1 destination abcd::/48;
}
routing-options {
  rib inet6.0 {
    static {
      route abcd::/48 {
        next-hop 8:3::1;
        retain;
      }
    }
  }
}
```

Related Documentation

- [Configuring Junos OS for the First Time on a Router or Switch with a Single Routing Engine on page 51](#)
- [Configuring Junos OS for the First Time on a Device with Dual Routing Engines on page 55](#)
- *Requirements for Routers with a Backup Router Configuration.*

Configuring Automatic Mirroring of the CompactFlash Card on the Hard Disk Drive

You can direct the hard disk to automatically mirror the contents of the CompactFlash card. When you include the **mirror-flash-on-disk** statement, the hard disk maintains a synchronized mirror copy of the CompactFlash card contents. Data written to the CompactFlash card is simultaneously updated in the mirrored copy of the hard disk. If the CompactFlash card fails to read data, the hard disk automatically retrieves its mirrored copy of the CompactFlash card. This feature is not available on the J Series routers.



CAUTION: We recommend that you disable flash-to-disk mirroring when you upgrade or downgrade the router.

You cannot issue the **request system snapshot** command while flash-to-disk mirroring is enabled.

To configure the mirroring of the CompactFlash card to the hard disk, include the **mirror-flash-on-disk** statement at the **[edit system]** hierarchy level:

```
[edit system]
mirror-flash-on-disk;
```



NOTE: After you have enabled or disabled the **mirror-flash-on-disk** statement, you must reboot the router for your changes to take effect. To reboot, issue the **request system reboot** command.

**Related
Documentation**

- [Using Junos OS to Specify the Number of Configurations Stored on the CompactFlash Card on page 72](#)
- [Configuring Junos OS for the First Time on a Router or Switch with a Single Routing Engine on page 51](#)

Using Junos OS to Specify the Number of Configurations Stored on the CompactFlash Card

By default, the Junos OS saves the current configuration and three previous versions of the committed configuration on the CompactFlash card. The currently operational Junos OS configuration is stored in the file **juniper.conf.gz**, and the last three committed configurations are stored in the files **juniper.conf.1.gz**, **juniper.conf.2.gz**, and **juniper.conf.3.gz**. These four files are located in the router or switch's CompactFlash card in the directory **/config**.

In addition to saving the current configuration and the current operational version, you can also specify how many previous versions of the committed configurations you want stored on the CompactFlash card in the directory **/config**. The remaining previous versions of committed configurations are stored in the directory **/var/db/config** on the hard disk. This is useful when you have very large configurations that might not fit on the CompactFlash card.

To specify how many previous versions of the committed configurations you want stored on the CompactFlash card, include the **max-configurations-on-flash** statement at the **[edit system]** hierarchy level:

```
[edit system]
max-configurations-on-flash number;
```

number is a value from 0 through 49.

**Related
Documentation**

- [Configuring Automatic Mirroring of the CompactFlash Card on the Hard Disk Drive on page 71](#)
- *max-configurations-on-flash*

Using Junos OS to Configure a Router or Switch to Transfer Its Configuration to an Archive Site

You can configure a router or switch to transfer its configuration to an archive file periodically. The following tasks describe how to transfer the configuration to an archive site:

1. [Configuring the Router or Switch to Transfer Its Currently Active Configuration to an Archive on page 73](#)
2. [Configuring the Transfer Interval for Periodic Transfer of the Active Configuration to an Archive Site on page 73](#)
3. [Configuring Transfer of the Current Active Configuration When a Configuration Is Committed on page 74](#)
4. [Configuring Archive Sites for Transfer of Active Configuration Files on page 74](#)

Configuring the Router or Switch to Transfer Its Currently Active Configuration to an Archive

If you want to back up your device's current configuration to an archive site, you can configure the router or switch to transfer its currently active configuration by FTP or secure copy (SCP) periodically or after each commit.

To configure the router or switch to transfer its currently active configuration to an archive site, include statements at the **[edit system archival configuration]** hierarchy level:

```
[edit system archival configuration]
archive-sites {
  ftp://username<:password>@host-address<:port>/url-path;
  scp://username<:password>@host-address<:port>/url-path;
}
transfer-interval interval;
transfer-on-commit;
```



NOTE: When specifying a URL in a Junos OS statement using an IPv6 host address, you must enclose the entire URL in quotation marks (") and enclose the IPv6 host address in brackets ([]). For example, "ftp://username<:password>@[ipv6-host-address]<:port>/url-path"

Configuring the Transfer Interval for Periodic Transfer of the Active Configuration to an Archive Site

To configure the router or switch to periodically transfer its currently active configuration to an archive site, include the **transfer-interval** statement at the **[edit system archival configuration]** hierarchy level:

```
[edit system archival configuration]
transfer-interval interval;
```

The **interval** is a period of time ranging from 15 through 2880 minutes.

Configuring Transfer of the Current Active Configuration When a Configuration Is Committed

To configure the router or switch to transfer its currently active configuration to an archive site each time you commit a candidate configuration, include the **transfer-on-commit** statement at the **[edit system archival configuration]** hierarchy level:

```
[edit system archival configuration]
transfer-on-commit;
```



NOTE: When specifying a URL in a Junos OS statement using an IPv6 host address, you must enclose the entire URL in quotation marks ("") and enclose the IPv6 host address in brackets ([]). For example,
"scp://username<:password>@[ipv6-host-address]<:port>/url-path"

Configuring Archive Sites for Transfer of Active Configuration Files

When you configure the router or switch to transfer its configuration files, you specify an archive site to which the files are transferred. If you specify more than one archive site, the router or switch attempts to transfer files to the first archive site in the list, moving to the next site only if the transfer fails.

When you use the **archive-sites** statement, you can specify a destination as an FTP URL, or SCP-style remote file specification. The URL type **file://** is also supported.

To configure the archive site, include the **archive-sites** statement at the **[edit system archival configuration]** hierarchy level:

```
[edit system archival configuration]
archive-sites {
  ftp://username@host:<port>url-path password password;
  scp://username@host:<port>url-path password password;
  file://<path>/<filename>;
}
```



NOTE: When specifying a URL in a Junos OS statement using an IPv6 host address, you must enclose the entire URL in quotation marks ("") and enclose the IPv6 host address in brackets ([]). For example,
"scp://username<:password>@[ipv6-host-address]<:port>/url-path"

When you specify the archive site, do not add a forward slash (/) to the end of the URL.

The destination filename is saved in the following format, where *n* corresponds to the number of the compressed configuration rollback file that has been archived:

```
<router-name>_juniper.conf.n.gz_YYYYMMDD_HHMMSS
```



NOTE: The time included in the destination filename is always in Coordinated Universal Time (UTC) regardless of whether the time on the router is configured as UTC or the local time zone. The default time zone on the router or switch is UTC.

Configuring the Physical Location of the Router or Switch

To configure the physical location of the router or switch, you can configure the following options for the **location** statement at the **[edit system]** hierarchy level:

- **altitude *feet***—Number of feet above sea level.
- **building *name***—Name of the building, 1 to 28 characters in length. If the string contains spaces, enclose it in quotation marks (" ").
- **country-code *code***—Two-letter country code.
- **floor *number***—Floor in the building.
- **hcoord *horizontal-coordinate***—Bellcore Horizontal Coordinate.
- **lata *service-area***—Long-distance service area.
- **latitude *degrees***—Latitude in degree format.
- **longitude *degrees***—Longitude in degree format.
- **npa-nxx *number***—First six digits of the phone number (area code and exchange).
- **postal-code *postal-code***—Postal code.
- **rack *number***—Rack number.
- **vcoord *vertical-coordinate***—Bellcore Vertical Coordinate.

The following example shows how to configure the physical location of the router or switch:

```
[edit system]
location {
  altitude feet;
  building name;
  country-code code;
  floor number;
  hcoord horizontal-coordinate;
  lata service-area;
  latitude degrees;
  longitude degrees;
  npa-nxx number;
  postal-code postal-code;
  rack number;
  vcoord vertical-coordinate;
}
```

- Related Documentation
- [Configuring Basic Router or Switch Properties on page 61](#)

Configuring the Root Password

The Junos OS is preinstalled on the router or switch. When the router or switch is powered on, it is ready to be configured. Initially, you log in as the user “root” with no password.



NOTE: If you configure a blank password using the `encrypted-password` statement at the `[edit system root-authentication]` hierarchy level for root authentication, you can commit a configuration, but you are *not* able to log in as superuser and gain root level access to the router or switch.

After you log in, you should configure the root (superuser) password by including the **root-authentication** statement at the `[edit system]` hierarchy level and configuring one of the password options:

```
[edit system]
root-authentication {
  (encrypted-password "password"| plain-text-password);
  load-key-file URL filename;
  ssh-dsa "public-key" <from hostname>;
  ssh-ecdsa "public-key" <from hostname>;
  ssh-rsa "public-key" <from hostname>;
}
```

If you configure the **plain-text-password** option, you are prompted to enter and confirm the password:

```
[edit system]
user@host# set root-authentication plain-text-password
New password: type password here
Retype new password: retype password here
```

The default requirements for plain-text passwords are:

- The password must be between 6 and 128 characters long
- You can include most character classes in a password (uppercase letters, lowercase letters, numbers, punctuation marks, and other special characters). Control characters are not recommended.
- Valid passwords must contain at least one change of case or character class.

You can use the **load-key-file** *URL filename* statement to load an SSH key file that was previously generated using **ssh-keygen**. The *URL filename* is the path to the file's location and name. When using this option, the contents of the key file are copied into the configuration immediately after entering the **load-key-file** *URL* statement. This command loads RSA (SSH version 1 and SSH version 2) and DSA (SSH version 2) public keys.

Optionally, you can use the **ssh-dsa**, **ssh-ecdsa**, or **ssh-rsa** statements to directly configure SSH RSA, DSA, or ECDSA keys to authenticate root logins. You can configure more than

one public key for SSH authentication of root logins as well as for user accounts. When a user logs in as root, the public keys are referenced to determine whether the private key matches any of them.

To view the SSH keys entries, use the configuration mode **show** command. For example:

```
[edit system]
user@host# set root-authentication load-key-file my-host:.ssh/id_dsa.pub
.file.19692 | 0 KB | 0.3 kB/s | ETA: 00:00:00 | 100%
[edit system]
user@host# show
root-authentication {
  ssh-rsa "1024 35 9727638204084251055468226757249864241630322
20740496252839038203869014158453496417001961060835872296
15634757491827360336127644187426594689320773910834481012
68312595772262546166799927831612350043866091586628382248
97467326056611921489539813965561563786211940327687806538
16960202749164163735913269396344008443 boojum@juniper.net"; #
  SECRET-DATA
}
```

Junos-FIPS software has special password requirements. FIPS passwords must be between 10 and 20 characters in length. Passwords must use at least three of the five defined character sets (uppercase letters, lowercase letters, digits, punctuation marks, and other special characters). If Junos-FIPS is installed on the router or switch, you cannot configure passwords unless they meet this standard. If you use the **encrypted-password** option, then a null-password (empty) is not permitted.

You cannot configure a blank password for **encrypted-password** using blank quotation marks (" "). You must configure a password whose number of characters range from 1 through 128 characters and enclose the password in quotation marks.

Related Documentation

- *Example: Configuring the Root Password*
- [Example: Configuring a Plain-Text Password for Root Logins on page 78](#)
- [Example: Configuring SSH Authentication for Root Logins on page 78](#)
- [Example: Changing the Requirements for Junos OS Plain-Text Passwords on page 81](#)
- *Recovering the Root Password*

Example: Configuring the Root Password

The following example shows how to configure the root password:

```
[edit]
user@switch# set system root-authentication encrypted-password
"$1$14c5.$sBopasddsdfo"
[edit]
user@switch# show
system {
  root-authentication {
    encrypted-password "$1$14c5.$sBopasddsdfo";
  }
}
```

```
}
```

Related Documentation

- [Configuring the Root Password on page 76](#)
- [Example: Configuring a Plain-Text Password for Root Logins on page 78](#)
- [Configuring the Root Password](#)

Example: Configuring a Plain-Text Password for Root Logins

The following example shows how to set a plain-text password for root logins:

```
[edit]
user@switch# set system root-authentication plain-text-password
New password: type root password
Retype new password: retype root password
[edit]
user@switch# show
system {
  root-authentication {
    encrypted-password "$1$14c5.$sBopasddsdfs0";
  }
}
```

Related Documentation

- [Configuring the Root Password on page 76](#)

Example: Configuring SSH Authentication for Root Logins

The following example shows how to configure two public DSA keys for SSH authentication of root logins:

```
[edit system]
root-authentication {
  encrypted-password "$1$1wp5tqMX$uy/u5H7OdXTwfWTmeJWXe/";
  ## SECRET-DATA;
  ssh-dsa "2354 95 9304@boojum.per";
  ssh-dsa "0483 02 8362@ecbatana.per";
}
```

Related Documentation

- [Configuring the Root Password on page 76](#)
- [Special Requirements for Junos OS Plain-Text Passwords on page 78](#)

Special Requirements for Junos OS Plain-Text Passwords

Junos OS has special requirements when you create plain-text passwords on a router or switch. [Table 7 on page 79](#) shows the default requirements.

Table 7: Special Requirements for Plain-Text Passwords

Junos OS	Junos-FIPS
The password must be between 6 and 128 characters long.	FIPS passwords must be between 10 and 20 characters long
You can include most character classes in a password (uppercase letters, lowercase letters, numbers, punctuation marks, and other special characters). Control characters are not recommended.	You can include most character classes in a password (uppercase letters, lowercase letters, numbers, punctuation marks, and other special characters). Control characters are not recommended.
Valid passwords must contain at least one change of case or character class.	Passwords must use at least three of the five defined character classes (uppercase letters, lowercase letters, numbers, punctuation marks, and other special characters).

You can change the requirements for plain-text passwords.

Junos OS supports the following five character classes for plain-text passwords:

- Lowercase letters
- Uppercase letters
- Numbers
- Punctuation
- Special characters: ! @ # \$ % ^ & *, + < > ; ;

Control characters are not recommended.

You can include the **plain-text-password** statement at the following hierarchy levels:

- [edit system diag-port-authentication]
- [edit system pic-console-authentication]
- [edit system root-authentication]
- [edit system login user *username* authentication]

The **change-type** statement specifies whether the password is checked for the following:

- The total number of character sets used (**character-set**)
- The total number of character set changes (**set-transitions**)

For example, the following password:

MyPassWd@2

has four character sets (uppercase letters, lowercase letters, special characters, and numbers) and seven character set changes (M–y, y–P, P–a, s–W, W–d, d–@, and @–2).

The **change-type** statement is optional. If you omit the **change-type** option, Junos-FIPS plain-text passwords are checked for character sets, and Junos OS plain-text passwords are checked for character set changes.

The **minimum-changes** statement specifies how many character sets or character set changes are required for the password. This statement is optional. If you do not use the **minimum-changes** statement, character sets are not checked for Junos OS. If the **change-type** statement is configured for the **character-set** option, then the **minimum-changes** value must be 5 or less, because Junos OS only supports five character sets.

The **format** statement specifies the hash algorithm (**md5**, **sha1** or **des**) for authenticating plain-text passwords. This statement is optional. For Junos OS, the default format is **md5**. For Junos-FIPS, only **sha1** is supported.

The **maximum-length** statement specifies the maximum number of characters allowed in a password. This statement is optional. By default, Junos OS passwords have no maximum; however, only the first 128 characters are significant. Junos-FIPS passwords must be 20 characters or less. The range for Junos OS maximum-length passwords is from 20 to 128 characters.

The **minimum-length** statement specifies the minimum number of characters required for a password. This statement is optional. By default, Junos OS passwords must be at least 6 characters long, and Junos-FIPS passwords must be at least 10 characters long. The range is from 6 to 20 characters.

Changes to password requirements do not take effect until the configuration is committed. When requirements change, only newly created, plain-text passwords are checked; existing passwords are not checked against the new requirements.

The default configuration for Junos OS plain-text passwords is:

```
[edit system login]
passwords {
  change-type character-sets;
  format md5;
  minimum-changes 1;
  minimum-length 6;
}
```

The default configuration for Junos-FIPS plain-text passwords is:

```
[edit system login]
passwords {
  change-type set-transitions;
  format sha1;
  maximum-length 20;
  minimum-changes 3;
  minimum-length 10;
}
```

- Related Documentation**
- [Changing the Requirements for Junos OS Plain-Text Passwords on page 81](#)
 - [Configuring the Root Password on page 76](#)
 - [*Changing the Requirements for Junos OS Plain-Text Passwords*](#)

- [Configuring the Root Password](#)

Changing the Requirements for Junos OS Plain-Text Passwords

To change the requirements for plain-text passwords, include the **password** statement at the **[edit system login]** hierarchy level:

```
[edit system login]
password {
  change-type (set-transitions | character-set);
  format (md5 | sha1);
  maximum-length length;
  minimum-changes number;
  minimum-length length;
  minimum-lower-cases number;
  minimum-numeric number;
  minimum-punctuations number;
  minimum-upper-cases number;
}
```



NOTE: These statements apply to plain-text passwords only, not encrypted passwords.

Related Documentation

- [Special Requirements for Junos OS Plain-Text Passwords on page 78](#)
- [Configuring the Root Password on page 76](#)
- [Example: Changing the Requirements for Junos OS Plain-Text Passwords on page 81](#)

Example: Changing the Requirements for Junos OS Plain-Text Passwords

This example shows how to set various maximum and minimum requirements for plain-text passwords to increase password strength.

- [Requirements on page 82](#)
- [Overview on page 82](#)
- [Configuration on page 82](#)

Requirements

This example requires a device running Junos 12.2 or greater. The **minimum-length** and **maximum-length** password requirements statements are available in earlier releases, however, you must have Junos OS Release 12.2 or greater to configure **minimum-lower-cases**, **minimum-numeric**s, **minimum-punctuations**, or **minimum-upper-cases**.

Overview

You can use a variety of requirements to strengthen plain-text passwords for greater security. Junos OS provides a number of possible configurations at the **[edit system login password]** hierarchy level that allow you to require users to create plain-text passwords that conform to a particular set of requirements that may include such things as length, number of changes, type of characters, numbers, or letter case.

Configuration

CLI Quick Configuration To quickly configure this example, copy the following commands, paste them into a text file, remove any line breaks, change any details necessary to match your network configuration, and then copy and paste the commands into the CLI at the **[edit]** hierarchy level.

```
set system login password minimum-length 12
set system login password maximum-length 22
set system login password minimum-numeric 1
set system login password minimum-upper-cases 1
set system login password minimum-lower-cases 1
set system login password minimum-punctuations 1
```

Configuring Requirements for Plain-Text Passwords

Step-by-Step Procedure This example configures password requirements that require the user to create a password that has a minimum length of 12 characters, a maximum length of 22 characters, and that includes at least one lower-case letter, at least one upper-case letter, at least one punctuation character, and at least one numeric character.

1. Navigate to configuration mode in the **[system login password]** hierarchy level.

```
user@host> edit
[edit]
user@host# edit system login password
```
2. Set a minimum length requirement of 12 characters and a maximum length requirement of 22 characters for user passwords.

```
[edit system login password]
user@host# set minimum-length 12
[edit system login password]
```

```
user@host# set maximum-length 22
```

3. Require users to set a password that has at least one lower-case letter and at least one upper-case letter.

```
[edit system login password]
user@host# set minimum-lower-cases 1
[edit system login password]
user@host# set minimum-upper-cases 1
```

4. Require users to set a password that has at least one punctuation-class character and at least one number.

```
[edit system login password]
user@host# set minimum-punctuations 1
[edit system login password]
user@host# set minimum-numeric 1
```

Results

From configuration mode, confirm your configuration by entering the show command at the edit system login password hierarchy level. If the output does not display the intended configuration, repeat the instructions in this example to correct the configuration.

```
[edit system login password]
user@host# show
minimum-length 12;
maximum-length 22;
minimum-numeric 1;
minimum-upper-cases 1;
minimum-lower-cases 1;
```

Related Documentation

- [Special Requirements for Junos OS Plain-Text Passwords on page 78](#)
- *password (Login)*

Configuring the Junos OS to Set Console and Auxiliary Port Properties

Each router or switch has a console port and an auxiliary port for connecting terminals to the router or switch. The console port is enabled by default, and its speed is 9600 baud. The auxiliary port is disabled by default.

To configure the properties for the console and auxiliary ports, include the **ports** statement at the **[edit system]** hierarchy level:

```
[edit system]
ports {
  auxiliary {
    disable;
    insecure;
    type terminal-type;
  }
  console {
    disable;
```

```
insecure;  
log-out-on-disconnect;  
type terminal-type;  
}  
}
```

By default, the terminal type is unknown, and the terminal speed is 9600 baud for both the console and auxiliary ports. To change the terminal type, include the **type** statement, specifying a *terminal-type* of **ansi**, **vt100**, **small-xterm**, or **xterm**. The first three terminal types set a screen size of 80 columns by 24 lines. The last type, **xterm**, sets the size to 80 columns by 65 rows.

By default, the console session is not logged out when the data carrier is lost on the console modem control lines. To log out the session when the data carrier on the console port is lost, include the **log-out-on-disconnect** statement. You can use the **show system users** command to verify the console session is logged out.



.....

NOTE: The **log-out-on-disconnect** statement is not operational on MX80 routers. On MX80 routers you must manually log out from the console with the **request system logout u0** command.

.....

By default, terminal connections to the console and auxiliary ports are secure. When you configure the console as insecure, root logins are not allowed to establish terminal connections. In addition, superusers and anyone with a user identifier (UID) of 0 are not allowed to establish terminal connections in multiuser mode when you configure the console as insecure. To disable root login connections to the console and auxiliary ports, include the **insecure** statement. This option can be used to prevent a user from attempting password recovery by booting into single-user mode, if the user does not know the root password.

To disable console login, include the **disable** statement. By default, console login is enabled.

For Common Criteria compliance, the console port must be disabled.

**Related
Documentation**

- [Methods for Configuring Junos OS on page 36](#)
- [console](#)
- [ports on page 157](#)

Configuring Multiple Routing Engines to Synchronize Committed Configurations Automatically

If your router or switch has multiple Routing Engines, you can manually direct one Routing Engine to synchronize its configuration with the others by issuing the **commit synchronize** command.

To make the Routing Engines synchronize automatically whenever a configuration is committed, include the **commit synchronize** statement at the **[edit system]** hierarchy level:

```
[edit system]
commit synchronize;
```

The Routing Engine on which you execute the **commit** command (requesting Routing Engine) copies and loads its candidate configuration to the other (responding) Routing Engines. All Routing Engines then perform a syntax check on the candidate configuration file being committed. If no errors are found, the configuration is activated and becomes the current operational configuration on all Routing Engines.

For the commit synchronization process, the master Routing Engine commits the configuration and sends a copy of the configuration to the backup Routing Engine. Then the backup Routing Engine loads and commits the configuration. So, the commit synchronization between the master and backup Routing Engines takes place one Routing Engine at a time. If the configuration has a large text size or many apply-groups, commit times can be longer than desired.

You can use the **commit fast-synchronize** statement to have the synchronization between the master and backup Routing Engines occur simultaneously instead of sequentially. This can reduce the time needed for synchronization because the commits on the master and backup Routing Engines occur in parallel.

Include the **fast-synchronize** statement at the **[edit system]** hierarchy level to have synchronize occur simultaneously between the master and the backup Routing Engines:

```
[edit system]
commit fast-synchronize
```



NOTE: If commit fails on either Routing Engine, the commit process is rolled back on the other Routing Engine as well. This ensures that both Routing Engines have the same configuration.

Related Documentation • [Junos OS Commit Model for Router or Switch Configuration on page 9](#)

Compressing the Current Configuration File

By default, the current operational configuration file is compressed, and is stored in the file **juniper.conf.gz**, in the **/config** file system, along with the last three committed versions of the configuration. If you have large networks, the current configuration file might exceed the available space in the **/config** file system. Compressing the current configuration file enables the file to fit in the file system, typically reducing the size of the file by 90 percent. You might want to compress your current operation configuration files when they reach 3 megabytes (MB) in size.

When you compress the current configuration file, the names of the configuration files change. To determine the size of the files in the `/config` file system, issue the `file list /config detail` command.



NOTE: We recommend that you compress the configuration files (this is the default) to minimize the amount of disk space that they require.

- If you want to compress the current configuration file, include the `compress-configuration-files` statement at the `[edit system]` hierarchy level:

```
[edit system]
compress-configuration-files;
```

Commit the current configuration file to include the `compression-configuration-files` statement. Commit the configuration again to compress the current configuration file:

```
[edit system]
user@host# set compress-configuration-files
user@host# commit
commit complete
user@host# commit
commit complete
```

- If you do not want to compress the current operational configuration file, include the `no-compress-configuration-files` statement at the `[edit system]` hierarchy level:

```
[edit system]
no-compression-configuration-files;
```

Commit the current configuration file to include the `no-compress-configuration-files` statement. Commit the configuration again to uncompress the current configuration file:

```
[edit system]
user@host# commit
commit complete
user@host# commit
commit complete
```

Related Documentation

- [Junos OS Commit Model for Router or Switch Configuration on page 9](#)
- `compress-configuration-files`

Configuring the Junos OS to Make the Router or Interface Act as a DHCP or BOOTP Relay Agent

To configure a router or interface to act as a bootstrap protocol (DHCP or BOOTP) relay agent, you include statements at the `[edit forwarding-options helpers]` hierarchy level.

For J Series Services Routers, you can configure a router or interface as a DHCP server by including statements at the `[edit system services]` hierarchy level.



NOTE: You cannot configure a router or interface as a DHCP server and a BOOTP relay agent at the same time.

Configuring the Junos OS to Display a System Login Message

By default, no login message is displayed. To configure a system login message, include the **message** statement at the **[edit system login]** hierarchy level:

```
[edit system login]
message text;
```

If the message text contains any spaces, enclose it in quotation marks.

You can format the message using the following special characters:

- \n—New line
- \t—Horizontal tab
- \'—Single quotation mark
- \"—Double quotation mark
- \\—Backslash

The following is a sample login message configuration:

```
[edit]
system {
  login {
    message "\n\n\n\tUNAUTHORIZED USE OF THIS SYSTEM\n
\tIS STRICTLY PROHIBITED!\n\n\tPlease contact
\t'company-noc@company.com\t' to gain\authorization
to this equipment if you need access.\n\n\n";
  }
}
```

The preceding login message configuration example produces a login message similar to the following:

```
server% telnet router1
Trying 1.1.1.1...
Connected to router1.
Escape character is '^['.
```

```
UNAUTHORIZED USE OF THIS SYSTEM
IS STRICTLY PROHIBITED!
```

```
Please contact 'company-noc@company.com' to gain
authorization to this equipment if you need access.
```

```
router1 (ttyp0)
```

login:

A system login message appears before the user logs in. A system login announcement appears after the user logs in. See [“Configuring the Junos OS to Display a System Login Announcement” on page 88](#).

**Related
Documentation**

- [Configuring the Junos OS to Display a System Login Announcement on page 88](#)
- [Defining Junos OS Login Classes](#)

Configuring the Junos OS to Display a System Login Announcement

By default, no login announcement is displayed. To configure a system login announcement, include the **announcement** statement at the **[edit system login]** hierarchy level:

```
[edit system login]  
announcement text;
```

If the announcement text contains any spaces, enclose it in quotation marks.

A system login announcement appears after the user logs in. A system login message appears before the user logs in. See [“Configuring the Junos OS to Display a System Login Message” on page 87](#).



TIP: You can use the same special characters described in [“Configuring the Junos OS to Display a System Login Message” on page 87](#) to format your system login announcement.

**Related
Documentation**

- [Configuring the Junos OS to Display a System Login Message on page 87](#)

Upgrading to 64-bit Junos OS

Just like any other operating system, the 64-bit version of Junos OS can address more memory than the 32-bit version of the operating system. In order to support larger Routing Engine memory sizes, an upgrade from the 32-bit to the 64-bit Junos OS running on the Routing Engine hardware is necessary. The upgrade path is relatively straightforward and another form of Routing Engine hardware and software upgrade. However, there are three different and distinct Routing Engine configurations that must be taken into account when upgrading to the 64-bit Junos OS. This topic covers all three.

The In Service Software Upgrade (ISSU) procedure is not supported while upgrading from the 32-bit version of Junos OS to the 64-bit version of Junos OS. The upgrade process involves some downtime, so traffic will be affected.



NOTE:

The 64-bit Junos OS is supported on the following Routing Engines only:

- RE-DUO-C1800-8G
- RE-DUO-C2600-16G
- RE-A-1800x2-16G
- RE-S-1800x4-16G
- RE-DUO-C1800-16G
- RE-JCS1200-1x2330

For a list of which routers support each Routing Engine, see

http://www.juniper.net/pub/en_US/dependent/junos/qcs/dependent/routing-engine-mx-series-support.html

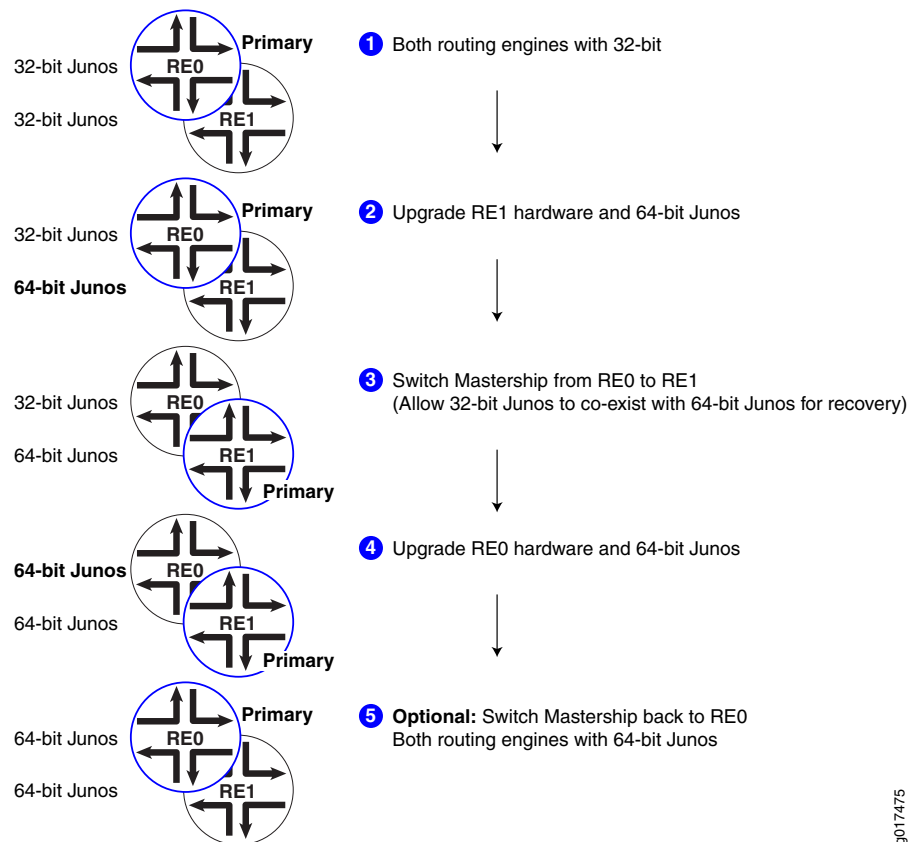
Before you begin, you must have:

- A properly configured and functional router
- One or two Routing Engines installed that support the 64-bit Junos OS
- Decided to allow single Routing Engines systems to use either slot 0 or slot 1 as master or not (this decision will determine which upgrade path to follow for single Routing Engine systems)

When you upgrade a Routing Engine to the 64-bit Junos OS, you can support larger Routing Engine memory sizes. However, the exact procedure depends on whether there are one or two Routing Engines installed. For systems with a single Routing Engine, the procedure varies based on whether the master Routing Engine must always be in slot 0 or not.

To upgrade a system with two Routing Engines, refer to [Figure 3 on page 90](#) and perform the following steps:

Figure 3: Upgrading to the 64-bit Junos OS with Dual Routing Engines

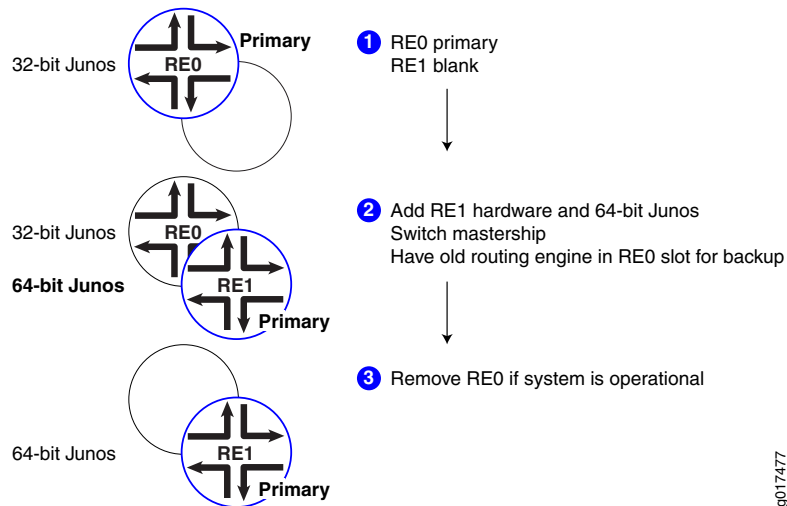


1. In the initial state, both Routing Engines are running the 32-bit Junos OS, and slot 0 has the master Routing Engine.
2. Upgrade the slot 1 Routing Engine hardware and install the 64-bit Junos OS.
For instructions on replacing a Routing Engine, see the hardware guide for your router.
3. Switch the master Routing Engine from slot 0 to slot 1 (allow the 32-bit Junos OS to co-exist with the 64-bit Junos OS).
4. Upgrade the slot 0 routing engine hardware and install the 64-bit Junos OS.
5. Both Routing Engines now run the 64-bit Junos OS. Optionally, you can switch the master Routing Engine back to slot 0.



NOTE: Mixing the 32-bit Junos OS with the 64-bit Junos OS is only supported temporarily during the upgrade process. Mixing the two operating systems is not supported for normal operations.

Figure 4: Upgrading to the 64-bit Junos OS with a Single Routing Engine (Master in Either Slot)

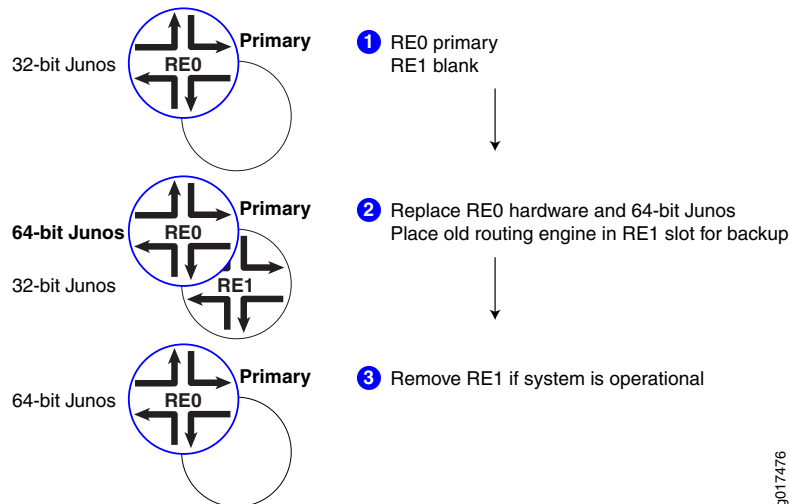


To upgrade a system with a single Routing Engine, where the master Routing Engine can be in either slot 0 or slot 1, refer to [Figure 3 on page 90](#) and perform the following steps:

1. In the initial state, the slot 0 Routing Engine is running the 32-bit Junos OS and slot 1 is blank.
2. Install the upgraded Routing Engine hardware in slot 1 and install the 64-bit Junos OS.
For instructions on installing a Routing Engine, see the hardware guide for your router.
3. When the 64-bit Junos OS is configured properly, remove the slot 0 Routing Engine running the 32-bit Junos OS.

To upgrade a system with a single Routing Engine, where the master Routing Engine must be in slot 0, refer to [Figure 5 on page 92](#) and perform the following steps:

Figure 5: Upgrading to the 64-bit Junos OS with a Single Routing Engine (Master Must Be in Slot 0)



1. In the initial state, the slot 0 Routing Engine is running the 32-bit Junos OS and slot 1 is blank.
2. Install the slot 0 Routing Engine hardware in slot 1. Install the upgraded Routing Engine hardware in slot 0 and install the 64-bit Junos OS.
For instructions on installing a Routing Engine, see the hardware guide for your router.
3. When the 64-bit Junos OS is configured properly, remove the slot 1 routing engine running the 32-bit Junos OS.

Related Documentation

- *Checklist for Reinstalling Junos OS*

Disk Space Management for Junos OS Installation

A Junos OS installation or upgrade may fail if your router has a shortage of disk space. If a disk space error occurs, use one or more of the following options to complete the installation:

- Use the **request system storage cleanup** command to delete unnecessary files and increase storage space on the router.
- Specify the **unlink** option when you use the **request system software add** command to install the Junos OS:
 - On the J Series routers, the **unlink** option removes the software package at the earliest opportunity to create enough disk space for the installation to finish.
 - On the M Series, MX Series, and T Series routers, the **unlink** option removes the software package after a successful upgrade.

- Download the software packages you need from the Juniper Networks Support Web site, <http://www.juniper.net/support/>. The download program provides intelligent disk space management to enable installation.



NOTE: If you are upgrading the J Series router from a remote location, the installation program automatically checks for enough disk space for the process to finish.

**Related
Documentation**

- [Junos OS Configuration Using the CLI on page 39](#)

CHAPTER 6

Using Configuration Groups

- [Creating a Junos Configuration Group on page 95](#)
- [Applying a Junos Configuration Group on page 97](#)
- [Example: Configuring Sets of Statements with Configuration Groups on page 98](#)
- [Example: Configuring Conditions for Applying Configuration Groups on page 100](#)
- [Example: Configuring and Applying Junos Configuration Groups on page 102](#)
- [Example: Configuring Interfaces Using Junos OS Configuration Groups on page 103](#)
- [Disabling Inheritance of a Junos OS Configuration Group on page 105](#)
- [Using Wildcards with Configuration Groups on page 107](#)
- [Improving Commit Time When Using Configuration Groups on page 110](#)
- [Example: Improving Commit Time When Using Configuration Groups on page 110](#)

Creating a Junos Configuration Group

To create a configuration group, include the **groups** statement at the **[edit]** hierarchy level:

```
[edit]
groups {
  group-name {
    configuration-data;
  }
  lccn-re0 {
    configuration-data;
  }
  lccn-re1 {
    configuration-data;
  }
}
```

group-name is the name of a configuration group. You can configure more than one configuration group by specifying multiple **group-name** statements. However, you cannot use the prefix **junos-** in a group name because it is reserved for use by Junos OS. Similarly, the configuration group **juniper-ais** is reserved exclusively for Juniper Advanced Insight Solutions (AIS)-related configuration. For more information on the **juniper-ais** configuration group, see the *Juniper Networks Advanced Insight Solutions Guide*.

One reason for the naming restriction is a configuration group called **junos-defaults**. This preset configuration group is applied to the configuration automatically. You cannot modify or remove the **junos-defaults** configuration group. For more information about the Junos default configuration group, see *Using Junos OS Defaults Groups*.

On routers that support multiple Routing Engines, you can also specify two special group names:

- **re0**—Configuration statements applied to the Routing Engine in slot 0.
- **re1**—Configuration statements applied to the Routing Engine in slot 1.

The configuration specified in group **re0** is only applied if the current Routing Engine is in slot 0; likewise, the configuration specified in group **re1** is only applied if the current Routing Engine is in slot 1. Therefore, both Routing Engines can use the same configuration file, each using only the configuration statements that apply to it. Each **re0** or **re1** group contains at a minimum the configuration for the hostname and the management interface (fxp0). If each Routing Engine uses a different management interface, the group also should contain the configuration for the backup router and static routes.

In addition, the TX Matrix router supports group names for the Routing Engines in each T640 router attached to the routing matrix. Providing special group names for all Routing Engines in the routing matrix allows you to configure the individual Routing Engines in each T640 router differently. Parameters that are not configured at the **[edit groups]** hierarchy level apply to all Routing Engines in the routing matrix.

configuration-data contains the configuration statements applied elsewhere in the configuration with the **apply-groups** statement. To have a configuration inherit the statements in a configuration group, include the **apply-groups** statement. For information about the **apply-groups** statement, see [“Applying a Junos Configuration Group” on page 97](#).

The group names for Routing Engines on the TX Matrix router have the following formats:

- **lccn-re0**—Configuration statements applied to the Routing Engine in slot 0 in a specified T640 router.
- **lccn-re1**—Configuration statements applied to the Routing Engine in slot 1 in a specified T640 router.

n identifies the T640 router and can be from 0 through 3. For example, to configure Routing Engine 1 properties for **lcc3**, you include statements at the **[edit groups lcc3-re1]** hierarchy level. For information about the TX Matrix router and routing matrix, see the *Junos OS Administration Library for Routing Devices*.



NOTE: The management Ethernet interface used for the TX Matrix Plus router, T1600 or T4000 routers in a routing matrix, and PTX Series Packet Transport Routers, is **em0**. Junos OS automatically creates the router's management Ethernet interface, **em0**.

Related Documentation

- [Applying a Junos Configuration Group on page 97](#)
- [Using Junos OS Defaults Groups](#)
- [Understanding the Junos Configuration Groups on page 12](#)
- [Disabling Inheritance of a Junos OS Configuration Group on page 105](#)
- [Using Wildcards with Configuration Groups on page 107](#)
- [Example: Configuring Sets of Statements with Configuration Groups on page 98](#)

Applying a Junos Configuration Group

To have a Junos configuration inherit the statements from a configuration group, include the **apply-groups** statement:

```
apply-groups [ group-names ];
```

If you specify more than one group name, list them in order of inheritance priority. The configuration data in the first group takes priority over the data in subsequent groups.

For routers that support multiple Routing Engines, you can specify **re0** and **re1** group names. The configuration specified in group **re0** is only applied if the current Routing Engine is in slot 0; likewise, the configuration specified in group **re1** is only applied if the current Routing Engine is in slot 1. Therefore, both Routing Engines can use the same configuration file, each using only the configuration statements that apply to it. Each **re0** or **re1** group contains at a minimum the configuration for the hostname and the management interface (**fxp0**). If each Routing Engine uses a different management interface, the group also should contain the configuration for the backup router and static routes.



NOTE: The management Ethernet interface used for the TX Matrix Plus router, T1600 or T4000 routers in a routing matrix, and PTX Series Packet Transport Routers, is **em0**.

You can include only one **apply-groups** statement at each specific level of the configuration hierarchy. The **apply-groups** statement at a specific hierarchy level lists the configuration groups to be added to the containing statement's list of configuration groups.

Values specified at the specific hierarchy level override values inherited from the configuration group.

Groups listed in nested **apply-groups** statements take priority over groups in outer statements. In the following example, the BGP neighbor **10.0.0.1** inherits configuration data from group **one** first, then from groups **two** and **three**. Configuration data in group **one** overrides data in any other group. Data from group **ten** is used only if a statement is not contained in any other group.

```
apply-groups [ eight nine ten ];
protocols {
```

```
apply-groups seven;
bgp {
  apply-groups [ five six ];
  group some-bgp-group {
    apply-groups four;
    neighbor 10.0.0.1 {
      apply-groups [ one two three ];
    }
  }
}
```

When you configure a group defined for the root level—that is, in the default logical system—you cannot successfully apply that group to a nondefault logical system under the `[edit logical-systems logical-system-name]` hierarchy level. Although the router accepts the commit if you apply the group, the configuration group does not take effect for the nondefault logical system. You can instead create an additional configuration group at the root level and apply it within the logical system. Alternatively, you can modify the original group so that it includes configuration for both the default and nondefault logical system hierarchy levels.

Related Documentation

- [Example: Configuring and Applying Junos Configuration Groups on page 102](#)
- [Disabling Inheritance of a Junos OS Configuration Group on page 105](#)
- [Creating a Junos Configuration Group on page 95](#)
- [Using Wildcards with Configuration Groups on page 107](#)
- [Example: Configuring Sets of Statements with Configuration Groups on page 98](#)

Example: Configuring Sets of Statements with Configuration Groups

When sets of statements exist in configuration groups, all values are inherited. For example:

```
[edit]
user@host# show
groups {
  basic {
    snmp {
      interface so-1/1/1.0;
    }
  }
}
apply-groups basic;
snmp {
  interface so-0/0/0.0;
}
[edit]
user@host# show | display inheritance
snmp {
  ##
  ## 'so-1/1/1.0' was inherited from group 'basic'
  ##
```

```

interface [ so-0/0/0.0 so-1/1/1.0 ];
}

```

For sets that are not displayed within brackets, all values are also inherited. For example:

```

[edit]
user@host# show
groups {
  worldwide {
    system {
      name-server {
        10.0.0.100;
        10.0.0.200;
      }
    }
  }
}
apply-groups worldwide;
system {
  name-server {
    10.0.0.1;
    10.0.0.2;
  }
}
[edit]
user@host# show | display inheritance
system {
  name-server {
    ##
    ## '10.0.0.100' was inherited from group 'worldwide'
    ##
    10.0.0.100;
    ##
    ## '10.0.0.200' was inherited from group 'worldwide'
    ##
    10.0.0.200;
    10.0.0.1;
    10.0.0.2;
  }
}

```

Related Documentation

- [Understanding the Junos Configuration Groups on page 12](#)
- [Creating a Junos Configuration Group on page 95](#)
- [Applying a Junos Configuration Group on page 97](#)

Example: Configuring Conditions for Applying Configuration Groups

This example shows how to configure conditions under which a specified configuration group is to be applied.

- [Requirements on page 100](#)
- [Overview on page 100](#)
- [Configuration on page 100](#)

Requirements

No special configuration beyond device initialization is required before you configure this example.

Overview

You can configure your group configuration data at the `[edit groups group-name]` hierarchy level, then use the **when** statement to have the group applied based on conditions including: type of chassis, model, routing-engine, virtual chassis member, cluster node, and start and optional end time of day or date.

If you specify multiple conditions in a single configuration group, all conditions must be met before the configuration group is applied.

You can specify the start time or the time duration for the configuration group to be applied. If only the start time is specified, the configuration group is applied at the specified time and it remains in effect until the time is changed. If the end time is specified, then on each day, the applied configuration group is started and stopped at the specified times.

This example sets conditions in a configuration group, **test1**, such that this group is applied only when all of the following conditions are met: the router is a model MX240 router with chassis type LCC0, with a Routing Engine operating as RE0, is member0 of the virtual chassis on node0, and the configuration group will only be in effect from 9:00 a.m. until 5:00 p.m. each day.

Configuration

CLI Quick Configuration

To quickly configure this example, copy the following commands, paste them into a text file, remove any line breaks, change any details necessary to match your network configuration, and then copy and paste the commands into the CLI at the **[edit]** hierarchy level.

```
set groups test1 when model mx240
set groups test1 when chassis lcc0
set groups test1 when routing-engine re0
set groups test1 when member member0
set groups test1 when node node0
set groups test1 when time 9 to 5
```

Step-by-Step Procedure

To configure conditions for configuration group **test1**:

1. Set the condition that identifies the model MX240 router.

```
[edit groups test1 when]
user@host# set model mx240
```
2. Set the condition that identifies the chassis type as LCC0.

```
[edit groups test1 when]
user@host# set chassis lcc0
```
3. Set the condition that identifies the Routing Engine operating as RE0.

```
[edit groups test1 when]
user@host# set routing-engine re0
```
4. Set the condition that identifies the virtual chassis **member0**.

```
[edit groups test1 when]
user@host# set member member0
```
5. Set the condition that identifies the cluster **node0**.

```
[edit groups test1 when]
user@host# set node node0
```
6. Set the condition that applies the group only between the hours of 9:00 a.m. and 5:00 p.m. daily.

```
[edit groups test1 when]
user@host# set time 9 to 5
```



NOTE: The syntax for specifying the time is: `time <start-time> [to <end-time>]` using the time format `yyyy-mm-dd.hh:mm`, `hh:mm`, or `hh`.

7. Commit the configuration.

```
user@host# commit
```

Results From configuration mode, confirm your configuration by entering the **show groups test1** command. If the output does not display the intended configuration, repeat the instructions in this example to correct the configuration.

```
user@host# show groups test1
when {
  time 9 to 5;
  chassis lcc0;
  model mx240;
  routing-engine re0;
  member member0;
  node node0;
}
```

Verification

Confirm that the configuration is working properly.

- [Checking Group Inheritance with Conditional Data on page 102](#)

Checking Group Inheritance with Conditional Data

Purpose Verify that conditional data from a configuration group is inherited when applied.

Action The **show | display inheritance** operational command can be issued with the **when** data to display the conditional inheritance. Using this example, you could issue one of these commands to determine that the conditional data was inherited:

```
user@host> show | display inheritance when model mx240
user@host> show | display inheritance when chassis lcc0
user@host> show | display inheritance when routing-engine re0
user@host> show | display inheritance when member member0
user@host> show | display inheritance when node node0
user@host> show | display inheritance when time 9 to 5
```

**Related
Documentation**

- [Understanding the Junos Configuration Groups on page 12](#)
- [Creating a Junos Configuration Group on page 95](#)
- [Applying a Junos Configuration Group on page 97](#)
- [Using Conditions to Apply Configuration Groups Overview on page 14](#)

Example: Configuring and Applying Junos Configuration Groups

In this example, the SNMP configuration is divided between the group **basic** and the normal configuration hierarchy.

There are a number of advantages to placing the system-specific configuration (SNMP contact) into a configuration group and thus separating it from the normal configuration hierarchy—the user can replace (using the **load replace** command) either section without discarding data from the other.

In addition, setting a contact for a specific box is now possible because the group data would be hidden by the router-specific data.

```
[edit]
groups {
  basic { # User-defined group name
    snmp { # This group contains some SNMP data
      contact "My Engineering Group";
      community BasicAccess {
        authorization read-only;
      }
    }
  }
}
```



```

apply-groups basic; # Enable inheritance from group "basic"
snmp { # Some normal (non-group) configuration
  location "West of Nowhere";
}

```

This configuration is equivalent to the following:

```

[edit]
snmp {
  location "West of Nowhere";
  contact "My Engineering Group";
  community BasicAccess {
    authorization read-only;
  }
}

```

For information about how to disable inheritance of a configuration group, see [“Disabling Inheritance of a Junos OS Configuration Group”](#) on page 105.

Related Documentation

- [Example: Creating and Applying Configuration Groups on a TX Matrix Router](#)
- [Example: Configuring Interfaces Using Junos OS Configuration Groups on page 103](#)
- [Example: Configuring Peer Entities](#)
- [Example: Referencing the Preset Statement From the Junos defaults Group](#)
- [Example: Viewing Default Statements That Have Been Applied to the Configuration](#)
- [Example: Configuring Sets of Statements with Configuration Groups on page 98](#)
- [Example: Configuring a Consistent IP Address for the Management Interface](#)
- [Creating a Junos Configuration Group on page 95](#)

Example: Configuring Interfaces Using Junos OS Configuration Groups

You can use configuration groups to separate the common interface media parameters from the interface-specific addressing information. The following example places configuration data for ATM interfaces into a group called **atm-options**:

```

[edit]
user@host# show
groups {
  atm-options {
    interfaces {
      <at-*> {
        atm-options {
          vpi 0 maximum-vcs 1024;
        }
        unit <*> {
          encapsulation atm-snap;
          point-to-point;
          family iso;
        }
      }
    }
  }
}

```

```
    }
  }
  apply-groups atm-options;
  interfaces {
    at-0/0/0 {
      unit 100 {
        vci 0.100;
        family inet {
          address 10.0.0.100/30;
        }
      }
      unit 200 {
        vci 0.200;
        family inet {
          address 10.0.0.200/30;
        }
      }
    }
  }
}
[edit]
user@host# show | display inheritance
interfaces {
  at-0/0/0 {
    ##
    ## "atm-options" was inherited from group "atm-options"
    ##
    atm-options {
      ##
      ## "1024" was inherited from group "atm-options"
      ##
      vpi 0 maximum-vcs 1024;
    }
    unit 100 {
      ##
      ## "atm-snap" was inherited from group "atm-options"
      ##
      encapsulation atm-snap;
      ##
      ## "point-to-point" was inherited from group "atm-options"
      ##
      point-to-point;
      vci 0.100;
      family inet {
        address 10.0.0.100/30;
      }
      ##
      ## "iso" was inherited from group "atm-options"
      ##
      family iso;
    }
    unit 200 {
      ##
      ## "atm-snap" was inherited from group "atm-options"
      ##
      encapsulation atm-snap;
      ##
```

```

    ## "point-to-point" was inherited from group "atm-options"
    ##
    point-to-point;
    vci 0.200;
    family inet {
        address 10.0.0.200/30;
    }
    ##
    ## "iso" was inherited from group "atm-options"
    ##
    family iso;
}
}
[edit]
user@host# show | display inheritance | except ##
interfaces {
  at-0/0/0 {
    atm-options {
      vpi 0 maximum-vcs 1024;
    }
    unit 100 {
      encapsulation atm-snap;
      point-to-point;
      vci 0.100;
      family inet {
        address 10.0.0.100/30;
      }
      family iso;
    }
    unit 200 {
      encapsulation atm-snap;
      point-to-point;
      vci 0.200;
      family inet {
        address 10.0.0.200/30;
      }
      family iso;
    }
  }
}

```

Related Documentation

- [Understanding the Junos Configuration Groups on page 12](#)
- [Creating a Junos Configuration Group on page 95](#)
- *Interface Naming Conventions Used in the Junos OS Operational Commands*
- *Example: Configuring a Consistent IP Address for the Management Interface*

Disabling Inheritance of a Junos OS Configuration Group

To disable inheritance of a configuration group at any level except the top level of the hierarchy, include the **apply-groups-except** statement:

```
apply-groups-except [ group-names ];
```

This statement is useful when you use the **apply-group** statement at a specific hierarchy level but also want to override the values inherited from the configuration group for a specific parameter.

Example: Disabling Inheritance on Interface so-1/1/0

In the following example, the **apply-groups** statement is applied globally at the interfaces level. The **apply-groups-except** statement is also applied at interface **so-1/1/0** so that it uses the default values for the **hold-time** and **link-mode** statements.

```
[edit]
groups { # "groups" is a top-level statement
  global { # User-defined group name
    interfaces {
      <*> {
        hold-time down 640;
        link-mode full-duplex;
      }
    }
  }
}
apply-groups global;
interfaces {
  so-1/1/0 {
    apply-groups-except global; # Disables inheritance from group "global"
    # so-1/1/0 uses default value for "hold-time"
    # and "link-mode"
  }
}
```

For information about applying a configuration group, see [“Applying a Junos Configuration Group” on page 97](#).

Configuration groups can add some confusion regarding the actual values used by the router, because configuration data can be inherited from configuration groups. To view the actual values used by the router, use the **display inheritance** command after the pipe (|) in a **show** command. This command displays the inherited statements at the level at which they are inherited and the group from which they have been inherited.

```
[edit]
user@host# show | display inheritance
snmp {
  location "West of Nowhere";
  ##
  ## 'My Engineering Group' was inherited from group 'basic'
  ##
  contact "My Engineering Group";
  ##
  ## 'BasicAccess' was inherited from group 'basic'
  ##
  community BasicAccess {
    ##
    ## 'read-only' was inherited from group 'basic'
    ##
    authorization read-only;
  }
}
```

```
}
```

To display the expanded configuration (the configuration, including the inherited statements) without the `##` lines, use the **except** command after the pipe in a **show** command:

```
[edit]
user@host# show | display inheritance | except ##
snmp {
  location "West of Nowhere";
  contact "My Engineering Group";
  community BasicAccess {
    authorization read-only;
  }
}
```



NOTE: Using the `display inheritance | except ##` option removes all the lines with `##`. Therefore, you might also not be able to view information about passwords and other important data where `##` is used. To view the complete configuration details with all the information without just the comments marked with `##`, use the `no-comments` option with the `display inheritance` command:

```
[edit]
user@host# show | display inheritance no-comments
snmp {
  location "West of Nowhere";
  contact "My Engineering Group";
  community BasicAccess {
    authorization read-only;
  }
}
```

Related Documentation

- [Applying a Junos Configuration Group on page 97](#)
- [Understanding the Junos Configuration Groups on page 12](#)

Using Wildcards with Configuration Groups

You can use wildcards to identify names and allow one statement to provide data for a variety of statements. For example, grouping the configuration of the **sonet-options** statement over all SONET/SDH interfaces or the dead interval for OSPF over all Asynchronous Transfer Mode (ATM) interfaces simplifies configuration files and eases their maintenance.

Using wildcards in normal configuration data is done in a style that is consistent with that used with traditional UNIX shell wildcards. In this style, you can use the following metacharacters:

- Asterisk (`*`)—Matches any string of characters.
- Question mark (`?`)—Matches any single character.

- Open bracket ([])—Introduces a character class.
- Close bracket (])—Indicates the end of a character class. If the close bracket is missing, the open bracket matches a [rather than introduce a character class.
- A character class matches any of the characters between the square brackets. Within a configuration group, an interface name that includes a character class must be enclosed in quotation marks.
- Hyphen (-)—Specifies a range of characters.
- Exclamation point (!)—The character class can be complemented by making an exclamation point the first character of the character class. To include a close bracket (]) in a character class, make it the first character listed (after the !, if any). To include a minus sign, make it the first or last character listed.

Wildcarding in configuration groups follows the same rules, but any term using a wildcard pattern must be enclosed in angle brackets *<pattern>* to differentiate it from other wildcarding in the configuration file.

```
[edit]
groups {
  sonet-default {
    interfaces {
      <so-*> {
        sonet-options {
          payload-scrambler;
          rfc-2615;
        }
      }
    }
  }
}
```

Wildcard expressions match (and provide configuration data for) existing statements in the configuration that match their expression only. In the previous example, the expression *<so-*>* passes its **sonet-options** statement to any interface that matches the expression *so-**.

The following example shows how to specify a range of interfaces:

```
[edit]
groups {
  gigabit-ethernet-interfaces {
    interfaces {
      "<ge-1/2/[5-8]>" {
        description "These interfaces reserved for Customer ABC";
      }
    }
  }
}
```

Angle brackets allow you to pass normal wildcarding through without modification. In any matching within the configuration, whether it is done with or without wildcards, the first item encountered in the configuration that matches is used. In the following example, data from the wildcarded BGP groups is inherited in the order in which the groups are

listed. The preference value from <*a*> overrides the preference in <*b*>, just as the p value from <*c*> overrides the one from <*d*>. Data values from any of these groups override the data values from **abcd**.

```
[edit]
user@host# show
groups {
  one {
    protocols {
      bgp {
        group <*a*> {
          preference 1;
        }
        group <*b*> {
          preference 2;
        }
        group <*c*> {
          out-delay 3;
        }
        group <*d*> {
          out-delay 4;
        }
        group abcd {
          preference 10;
          hold-time 10;
          out-delay 10;
        }
      }
    }
  }
}
protocols {
  bgp {
    group abcd {
      apply-groups one;
    }
  }
}
[edit]
user@host# show | display inheritance
protocols {
  bgp {
    group abcd {
      ##
      ## '1' was inherited from group 'one'
      ##
      preference 1;
      ##
      ## '10' was inherited from group 'one'
      ##
      hold-time 10;
      ##
      ## '3' was inherited from group 'one'
      ##
      out-delay 3;
```

```
    }  
  }  
}
```

**Related
Documentation**

- [Selecting Wildcard Names](#)
- [Applying a Junos Configuration Group on page 97](#)
- [Creating a Junos Configuration Group on page 95](#)
- [Understanding the Junos Configuration Groups on page 12](#)

Improving Commit Time When Using Configuration Groups

Configuration groups are used for applying configurations across other hierarchies without re-entering configuration data. Some configuration groups specify every configuration detail. Other configuration groups make use of wildcards to configure ranges of data, without detailing each configuration line. Some configurations have an inheritance path that includes a long string of configurations to be applied.

When a configuration that uses configuration groups is committed, the commit process expands and reads all of the configuration data of the group into memory in order to apply the configurations as intended. The commit performance can be negatively impacted if many configuration groups are being applied, especially if the configuration groups use wildcards extensively.

If your system uses many configuration groups that use wildcards, you can configure the **persist-groups-inheritance** statement at the **[edit system commit]** hierarchy level to improve commit time performance.

Using this option allows the system to build the inheritance path for each configuration group inside the database, instead of in the process memory. This can improve commit time performance. However, it can also increase the database size by up to 22 percent.

**Related
Documentation**

- [Example: Improving Commit Time When Using Configuration Groups on page 110](#)
- [persist-groups-inheritance on page 154](#)

Example: Improving Commit Time When Using Configuration Groups

This example shows how to use the **persist-groups-inheritance** configuration statement to improve commit time performance when committing configurations that make use of many configuration groups that are created using wildcards.

- [Requirements on page 111](#)
- [Overview on page 111](#)
- [Configuration on page 111](#)
- [Verification on page 111](#)

Requirements

This example uses the following hardware and software components:

- One Juniper Networks M Series, MX Series, or T Series router that uses a number of configuration groups created with wildcards.
- Junos OS Release 13.2 or later.

Overview

When committing a configuration that uses configuration groups, at the time of commit, all of the inheritance paths of the configuration groups must be fully expanded into memory to apply the configurations as intended. This can negatively impact commit performance if there are many configuration groups and they are configured using wildcards.

To improve commit performance, you can configure **persist-groups-inheritance** at the **[edit system commit]** hierarchy level. Configuring this option causes the configuration groups to be expanded into the database instead of into the process memory at commit time.

Configuration

Configuring Persist Groups Inheritance

Step-by-Step Procedure

To configure **persist-groups-inheritance**:

1. Set the **persist-groups-inheritance** option.

```
[edit system commit]  
user@host# set persist-groups-inheritance
```
2. Commit the configuration.

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

Verification

Verifying the Configuration

Purpose Verify that **persist-groups-inheritance** is configured.

Action To confirm the configuration, use the **show system commit** command.

```
[edit ]  
user@host# show system commit  
persist-groups-inheritance
```

Related Documentation

- [Improving Commit Time When Using Configuration Groups on page 110](#)
- [persist-groups-inheritance on page 154](#)

CHAPTER 7

Junos Processes

- [Disabling Junos OS Processes on page 113](#)
- [Viewing Core Files from Junos OS Processes on page 114](#)
- [Saving Core Files from Junos OS Processes on page 114](#)
- [Configuring Failover to Backup Media if a Junos OS Process Fails on page 114](#)
- [Using Virtual Memory for Process Configuration Data on page 115](#)
- [Example: Configuring Virtual Memory for Process Configuration Data on page 116](#)

Disabling Junos OS Processes



CAUTION: Never disable any of the software processes unless instructed to do so by a Customer Support engineer.

To disable a software process, specify the appropriate option in the **processes** statement at the **[edit system]** hierarchy level:

```
[edit system]
processes {
  process-name (enable | disable);
}
```



NOTE: The *process-name* variable is one of the valid process names. You can obtain a complete list of process names by using the CLI command completion feature. For additional information, see [processes](#).

Related Documentation

- [Configuring Failover to Backup Media if a Junos OS Process Fails on page 114](#)
- [Configuring Password Authentication for the Diagnostics Port](#)
- [Viewing Core Files from Junos OS Processes on page 114](#)

Viewing Core Files from Junos OS Processes

When an internal Junos process generates a core file, the output found at **/var/crash/** and **/var/tmp/** can now be viewed. This provides a quick method of finding core issues across large networks.

Use the CLI command **show system core-dumps** to view core files.

```
root@host> show system core-dumps
-rw----- 1 root  wheel  268369920 Jun 18 17:59 /var/crash/vmcore.0
-rw-rw---- 1 root  field   3371008 Jun 18 17:53 /var/tmp/rpd.core.0
-rw-r--r-- 1 root  wheel   27775914 Jun 18 17:59 /var/crash/kernel.0
```

Related Documentation

- [Saving Core Files from Junos OS Processes on page 114](#)
- [Saving Core Files Generated by Junos OS Processes](#)

Saving Core Files from Junos OS Processes

By default, when an internal Junos process generates a core file, the file and associated context information are saved for debugging purposes in a compressed tar file named **/var/tmp/process-name.core.core-number.tgz**. The contextual information includes the configuration and system log message files.

To disable the saving of core files and associated context information, include the **no-saved-core-context** statement at the **[edit system]** hierarchy level:

```
[edit system]
no-saved-core-context;
```

To save the core files only, include the **saved-core-files** statement at the **[edit system]** hierarchy level and specify the number of files to save:

```
[edit system]
saved-core-files number;
```

number is the number of core files to save and can be a value from 1 through 10.

To save the core files along with the contextual information, include the **saved-core-context** statement at the **[edit system]** hierarchy level:

```
[edit system]
saved-core-context;
```

Related Documentation

- [Viewing Core Files from Junos OS Processes on page 114](#)

Configuring Failover to Backup Media if a Junos OS Process Fails

For routers or switches with redundant Routing Engines, you can configure the router or switch to switch to backup media that contains a version of the system if a software process fails repeatedly. You can configure the router or switch to fail over either to

backup media or to the other Routing Engine. To configure automatic switchover to backup media if a software process fails, include the **failover** statement at the **[edit system processes process-name]** hierarchy level:

```
[edit system processes]
process-name failover (alternate-media | other-routing-engine);
```

process-name is one of the valid process names. If this statement is configured for a process, and that process fails four times within 30 seconds, the router reboots from either the alternative media or the other Routing Engine.

**Related
Documentation**

- [Disabling Junos OS Processes on page 113](#)
- [Saving Core Files from Junos OS Processes on page 114](#)
- [processes on page 159](#)

Using Virtual Memory for Process Configuration Data

Configuration data for each process in Junos OS is stored in memory that is mapped within the address space of each process, requiring a fixed maximum space to be reserved in each process. Typically, the maximum database size available is 680 MB for the i386 platform and 238 MB for other platforms. This scheme works well until a process is managing many functions at commit time and negatively impacts the commit time, or simply needs more memory than the default allotment. For example, the rpd process might be managing many routes and require more space to store important information about the routes.

In circumstances that require more than the maximum memory-mapped size, you can use **virtual-memory-mapping** at the **[edit system configuration-database]** hierarchy level to make more memory available for the configuration database per process.

You can configure a portion of virtual memory at a fixed size for the initial portion of the configuration database, and you can specify an amount to be used for page-pooling. Page-pooling uses a small amount of memory to bring database pages into memory as needed, rather than mapping the entire configuration database into the virtual memory space for the process.

For i386 platforms on the M, MX, and T Series devices only, you can also extend the configuration database size from a maximum of 680 MB to 1.5 GB.

**Related
Documentation**

- [Example: Configuring Virtual Memory for Process Configuration Data on page 116](#)
- [configuration-database on page 137](#)
- [extend-size on page 141](#)
- [virtual-memory-mapping on page 172](#)

Example: Configuring Virtual Memory for Process Configuration Data

This example shows how to use **virtual-memory-mapping** to configure different fixed and page-pooling sizes for the configuration database for individual processes in Junos OS.

- [Requirements on page 116](#)
- [Overview on page 116](#)
- [Configuration on page 117](#)

Requirements

This example uses the following hardware and software components:

- A Juniper Networks M, MX, or T Series router
- Junos OS 13.2 or later

Overview

Typically, the maximum database size available for storing configuration data per process is 680 MB for the i386 platform and 238 MB for other platforms, and it is mapped within the address space reserved for that process. Depending on the process, this database size might impact commit performance for a process that manages many changes at commit. To improve commit performance, you can use **virtual-memory-mapping** at the **[edit system configuration-database]** hierarchy level to allocate virtual memory for storing process configuration data on a per-process basis. You can configure a portion of the virtual memory as fixed size and a portion for page-pooling. Page-pooling uses just a small amount of memory to swap pages in or out as needed, rather than mapping the entire configuration database at once.

Using **virtual-memory-mapping** and enabling page-pooling are methods used to improve commit performance for processes that manage many changes at commit time that negatively impact commit performance.

On i386 systems only, to improve commit performance for mgd, you can use **extend-size** at the **[edit system configuration-database]** hierarchy level to increase the configuration database size from 680 MB to 1.5 GB. The extended size will automatically be used by mgd. Other processes will only be able to access the increased size by using page-pooling.

The configurations provided here are only examples. The sizes and processes that you configure will be different depending on the needs of your system.

Syntax

The syntax structure used in this example is available in Junos OS Release 13.2 or later.

```
system {  
  configuration-database {  
    virtual-memory-mapping {  
      process process name {  
        fixed-size size KB;  
        page-pooling-size size KB;  
      }  
    }  
  }  
}
```

```

    }
  }
  extend-size;
}

```

Configuration

- [Configuring Virtual Memory Parameters for a Single Process on page 117](#)
- [Configuring Virtual Memory Parameters for Multiple Processes on page 118](#)
- [Configuring Extended Size for the Configuration Database on page 119](#)

Configuring Virtual Memory Parameters for a Single Process

Step-by-Step Procedure

This example sets parameters of 512 KB for the fixed size and 512 KB for the page-pooling size of virtual memory mapping for the interface-control process, which controls the router's physical interface devices and logical interfaces.

This example assumes that the interface-control process on this sample system manages so many changes at commit time that performance is impacted. After completing this configuration on this system, the user expects improvement in the commit time performance.

1. Set the virtual memory fixed size to 512 KB and the page-pooling size to 512 KB for the interface-control process.

[edit]

```

user@host# set system configuration-database virtual-memory-mapping process
interface-control fixed-size 512 page-pooling 512

```

2. Commit the changes.

```

user@host# commit

```

Results Verify the setup using the `show system configuration-database` command.

```

user@host# show system configuration-database

```

```

configuration-database {
  virtual-memory-mapping {
    process interface-control {
      fixed-size 512;
      page-pooling-size 512;
    }
  }
}

```

Configuring Virtual Memory Parameters for Multiple Processes

Step-by-Step Procedure You can configure virtual memory parameters for configuration data for more than one process on a single system. This example configures parameters to enable page-pooling for the processes: interface-control, mib-process, firewall, event-processing, vrrp, and snmp.

1. Set the fixed-size to 20480 and set the page-pooling size to 30720 for the interface-control process.

```
user@host# set system configuration-database virtual-memory-mapping process
interface-control fixed-size 20480 page-pooling 30720
```
2. Set the fixed-size to 512 and set the page-pooling size to 30720 for the mib-process.

```
user@host# set system configuration-database virtual-memory-mapping process
mib-process fixed-size 512 page-pooling 30720
```
3. Set the fixed-size to 30720 and set the page-pooling size to 1024 for the firewall process.

```
user@host# set system configuration-database virtual-memory-mapping process
firewall 30720 page-pooling 1024
```
4. Set the fixed-size to 10240 and set the page-pooling size to 10240 for the snmp process.

```
user@host# set system configuration-database virtual-memory-mapping process
snmp fixed-size 10240 page-pooling 10240
```
5. Commit the changes.

```
user@host# commit
```

Results Verify the setup using the `show system configuration-database` command.

```
user@host# show system configuration-database
configuration-database {
  virtual-memory-mapping {
    process interface-control {
      fixed-size 20480;
      page-pooling-size 30720;
    }
    process mib-process {
      fixed-size 512;
      page-pooling-size 30720;
    }
    process firewall {
      fixed-size 30720;
      page-pooling-size 1024;
    }
    process snmp {
      fixed-size 10240;
      page-pooling-size 10240;
    }
  }
}
```


Configuring Extended Size for the Configuration Database

Step-by-Step Procedure This example increases the configuration database size available to mgd and other processes on i386 versions of M, MX, or T Series platforms to 1.5 GB from the default of 680 MB.



NOTE: This feature is only available on i386 platforms, and mgd automatically uses the increased database size. To make the extended memory available for other processes, enable [page-pooling-size](#) under [virtual-memory-mapping](#).

1. Extend the configuration database size.

```
[edit]
user@host# set system configuration-database extend-size
```
2. Commit the changes.

```
user@host# commit
```

Results Verify the setup using the `show system configuration-database` command. For brevity, this show output includes only the configuration that is relevant to this example.

```
user@host# show system configuration-database
configuration-database {
...
  extend-size;
}
```

- Related Documentation**
- [Using Virtual Memory for Process Configuration Data on page 115](#)
 - [configuration-database on page 137](#)
 - [extend-size on page 141](#)
 - [virtual-memory-mapping on page 172](#)

Configuration Statements

- [System Management Configuration Statements on page 121](#)

System Management Configuration Statements

This topic lists all the configuration statements that you can include at the **[edit system]** hierarchy level to configure system management features:

```
system {
  accounting {
    events [ login change-log interactive-commands ];
    destination {
      radius {
        server {
          server-address {
            accounting-port port-number;
            retry number;
            secret password;
            source-address address;
            timeout seconds;
          }
        }
      }
    }
    tacplus {
      server {
        server-address {
          port port-number;
          secret password;
          single-connection;
          timeout seconds;
        }
      }
    }
  }
}
archival {
  configuration {
    archive-sites {
      ftp://<username>:<password>@<host>:<port>/<url-path>;
      ftp://<username>:<password>@<host>:<port>/<url-path>;
    }
    transfer-interval interval;
  }
}
```

```

        transfer-on-commit;
    }
}
allow-v4mapped-packets;
arp {
    aging-timer minutes;
    gratuitous-arp-delay;
    gratuitous-arp-on-ifup;
    interfaces;
    passive-learning;
    purging;
}
authentication-order [ authentication-methods ];
backup-router address <destination destination-address>;
commit {
    commit fast-synchronize;
    persist-groups-inheritance ;
    server;
    synchronize
}
synchronize;
(compress-configuration-files | no-compress-configuration-files);
default-address-selection;
dump-device (compact-flash | remove-compact | usb);
diag-port-authentication (encrypted-password "password" | plain-text-password);
dynamic-profile-options {
    versioning;
}
domain-name domain-name;
domain-search [ domain-list ];
host-name hostname;
inet6-backup-router address <destination destination-address>;
internet-options {
    tcp-mss mss-value;
    (gre-path-mtu-discovery | no-gre-path-mtu-discovery);
    icmpv4-rate-limit bucket-size bucket-size packet-rate packet-rate;
    icmpv6-rate-limit bucket-size bucket-size packet-rate packet-rate;
    (ipip-path-mtu-discovery | no-ipip-path-mtu-discovery);
    (ipv6-path-mtu-discovery | no-ipv6-path-mtu-discovery);
    ipv6-path-mtu-discovery-timeout;
    no-tcp-rfc1323-paws;
    no-tcp-rfc1323;
    (path-mtu-discovery | no-path-mtu-discovery);
    source-port upper-limit <upper-limit>;
    (source-quench | no-source-quench);
    tcp-drop-synfin-set;
}
location {
    altitude feet;
    building name;
    country-code code;
    floor number;
    hcoord horizontal-coordinate;
    lata service-area;
    latitude degrees;
    longitude degrees;

```

```

npa-nxx number;
postal-code postal-code;
rack number;
vcoord vertical-coordinate;
}
login {
  announcement text;
  class class-name {
    access-end;
    access-start;
    allow-commands "regular-expression";
    ( allow-configuration | allow-configuration-regexps ) "regular expression 1" "regular
      expression 2";
    allowed-days;
    deny-commands "regular-expression";
    ( deny-configuration | deny-configuration-regexps ) "regular expression 1" "regular
      expression 2";
    idle-timeout minutes;
    login-script
    login-tip;
    permissions [ permissions ];
  }
  message text;
  password {
    change-type (set-transitions | character-set);
    format (md5 | sha1 | des);
    maximum-length length;
    minimum-changes number;
    minimum-length length;
  }
  retry-options {
    backoff-threshold number;
    backoff-factor seconds;
    minimum-time seconds;
    tries-before-disconnect number;
  }
  user username {
    full-name complete-name;
    uid uid-value;
    class class-name;
    authentication {
      (encrypted-password "password" | plain-text-password);
      ssh-rsa "public-key";
      ssh-dsa "public-key";
    }
  }
}
login-tip number;
mirror-flash-on-disk;
name-server {
  address;
}
no-multicast-echo;
no-redirects;
no-ping-record-route;
no-ping-time-stamp;

```

```
ntp {
  authentication-key key-number type type value password;
  boot-server address;
  broadcast <address> <key key-number> <version value> <ttl value>;
  broadcast-client;
  multicast-client <address>;
  peer address <key key-number> <version value> <prefer>;
  source-address source-address;
  server address <key key-number> <version value> <prefer>;
  trusted-key [ key-numbers ];
}
ports {
  auxiliary {
    type terminal-type;
  }
  pic-console-authentication {
    encrypted-password encrypted-password;
    plain-text-password;
    console {
      insecure;
      log-out-on-disconnect;
      type terminal-type;
      disable;
    }
  }
}
processes {
  process--name (enable | disable) failover (alternate-media | other-routing-engine);
  timeout seconds;
}
}
radius-server server-address {
  accounting-port port-number;
  port port-number;
  retry number;
  secret password;
  source-address source-address;
  timeout seconds;
}
radius-options {
  password-protocol mschap-v2;
}
attributes {
  nas-ip-address ip-address;
}
root-authentication {
  (encrypted-password "password" | plain-text-password);
  ssh-rsa "public-key";
  ssh-dsa "public-key";
}
(saved-core-context | no-saved-core-context);
saved-core-files saved-core-files;
scripts {
  commit {
    allow-transients;
    file filename {
      optional;
      refresh;
    }
  }
}
```

```

        refresh-from url;
        source url;
    }
    traceoptions {
        file <filename> <files number> <size size> <world-readable | no-world-readable>;
        flag flag;
        no-remote-trace;
    }
}
op {
    file filename {
        arguments {
            argument-name {
                description descriptive-text;
            }
        }
        command filename-alias;
        description descriptive-text;
        refresh;
        refresh-from url;
        source url;
    }
    refresh;
    refresh-from url;
    traceoptions {
        file <filename> <files number> <size size> <world-readable | no-world-readable>;
        flag flag;
        no-remote-trace;
    }
}
}
services {
    finger {
        connection-limit limit;
        rate-limit limit;
    }
    flow-tap-dtcp {
        ssh {
            connection-limit limit;
            rate-limit limit;
        }
    }
    ftp {
        connection-limit limit;
        rate-limit limit;
    }
    service-deployment {
        servers server-address {
            port port-number;
        }
        source-address source-address;
    }
    ssh {
        root-login (allow | deny | deny-password);
        protocol-version [v1 v2];
        connection-limit limit;
        rate-limit limit;
    }
}

```

```

}
telnet {
    connection-limit limit;
    rate-limit limit;
}
web-management {
    http {
        interfaces [ interface-names ];
        port port;
    }
    https {
        interfaces [ interface-names ];
        local-certificate name;
        port port;
    }
    session {
        idle-timeout [ minutes ];
        session-limit [ session-limit ];
    }
}
xnm-clear-text {
    connection-limit limit;
    rate-limit limit;
}
xnm-ssl {
    connection-limit limit;
    local-certificate name;
    rate-limit limit;
}
}
static-host-mapping {
    hostname {
        alias [ alias ];
        inet [ address ];
        sysid system-identifier;
    }
}
syslog {
    archive <files number> <size size> <world-readable | no-world-readable>;
    console {
        facility severity;
    }
    file filename {
        facility severity;
        archive <archive-sites {ftp-url <password password>}> <files number> <size size>
            <start-time "YYYY-MM-DD.hh:mm"> <transfer-interval minutes> <world-readable |
            no-world-readable>;
        explicit-priority;
        match "regular-expression";
        structured-data {
            brief;
        }
    }
}
host (hostname | other-routing-engine | scc-master) {
    facility severity;
    explicit-priority;
}

```





```
    facility-override facility;  
    log-prefix string;  
    match "regular-expression";  
    source-address source-address;  
    structured-data {  
        brief;  
    }  
}  
source-address source-address;  
time-format (year | millisecond | year millisecond);  
user (username | *) {  
    facility severity;  
    match "regular-expression";  
}  
}  
tacplus-options {  
    service-name service-name;  
    (no-cmd-attribute-value | exclude-cmd-attribute);  
}  
tacplus-server server-address {  
    secret password;  
    single-connection;  
    source-address source-address;  
    timeout seconds;  
}  
time-zone (GMThour-offset | time-zone);  
}  
tracing {  
    destination-override {  
        syslog host;  
    }  
}  
use-imported-time-zones;  
}
```

announcement

Syntax	announcement <i>text</i> ;
Hierarchy Level	[edit system login]
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	Configure a system login announcement. This announcement appears after a user logs in.
Options	<i>text</i> —Text of the announcement. If the text contains any spaces, enclose it in quotation marks.
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">• Configuring the Junos OS to Display a System Login Announcement on page 88• message on page 150

archival

Syntax	<pre> archival { configuration { archive-sites { file://<path>/<filename>; ftp://username@host:<port>url-path password password; http://username@host:<port>url-path password password; pasvftp://username@host:<port>url-path password password; scp://username@host:<port>url-path password password; } transfer-interval interval; transfer-on-commit; } } </pre>
Hierarchy Level	[edit system]
Release Information	<p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 11.1 for the QFX Series.</p>
Description	Configure copying of the currently active configuration to an archive site. An archive site can be a file, or an FTP or SCP location.
	<div>  <p>NOTE: The <code>edit system archival</code> hierarchy is not available on QFabric systems.</p> </div>
Options	The remaining statements are explained separately.
	<div>  <p>NOTE: The <code>[edit system archival]</code> hierarchy is not available on QFabric systems.</p> </div>
Required Privilege Level	<p>admin—To view this statement in the configuration.</p> <p>admin-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> Using Junos OS to Configure a Router or Switch to Transfer Its Configuration to an Archive Site on page 73

archive-sites (Configuration File)

Syntax archive-sites {
 file://<path>/<filename>;
 ftp://username@host:<port>url-path password password;
 http://username@host:<port>url-path password password;
 pasvftp://username@host:<port>url-path password password;
 scp://username@host:<port>url-path password password;
 }

Hierarchy Level [edit system archival configuration]

Release Information Statement introduced before Junos OS Release 7.4.
 Statement introduced in Junos OS Release 9.0 for EX Series switches.
 Statement introduced in Junos OS Release 11.1 for the QFX Series.

Description Specify where to transfer the current configuration files. When specifying a URL in a Junos OS statement using an IPv6 host address, you must enclose the entire URL in quotation marks (" ") and enclose the IPv6 host address in brackets ([]). For example,
 "scp://username<:password>@[ipv6-host-address]<:port>/url-path"

If you specify more than one archive site, the router or switch attempts to transfer the configuration files to the first archive site in the list, moving to the next only if the transfer fails.

The destination filename is saved in the following format, where *n* corresponds to the number of the compressed configuration rollback file that has been archived:

router-name_juniper.conf.n.gz_YYYYMMDD_HHMMSS.



NOTE: The time included in the destination filename is always in Coordinated Universal Time (UTC) regardless of whether the time on the router or switch is configured as UTC or the local time zone. The default time zone on the router or switch is UTC.



NOTE: The [edit system archival] hierarchy is not available on QFabric systems.

Options The prefix used in the configuration statement determines the form of transfer:

file:// —transfer on a path to a named file

ftp:// —transfer using active FTP server

pasvftp:// —transfer to a device that only accepts passive FTP services

scp:// —transfer to a known host using background SCP file transfers

Required Privilege	system—To view this statement in the configuration.
Level	system-control—To add this statement to the configuration.

Related Documentation	<ul style="list-style-type: none">• Configuring Archive Sites for Transfer of Active Configuration Files on page 74• Junos OS Commit Model for Router or Switch Configuration on page 9• configuration on page 136• transfer-on-commit on page 170
------------------------------	---

autoinstallation

Syntax	<pre>autoinstallation { configuration-servers { url; } interfaces { interface-name { bootp; rarp; } } }</pre>
Hierarchy Level	[edit system]
Release Information	<p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.1 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 12.2 for ACX Series Universal Access Routers.</p>
Description	<p>For ACX Series routers, J Series Services routers, and EX Series switches only. Download a configuration file automatically from an FTP, Hypertext Transfer Protocol (HTTP), or Trivial FTP (TFTP) server. When you power on a router or switch configured for autoinstallation, it requests an IP address from a Dynamic Host Configuration Protocol (DHCP) server. Once the router or switch has an address, it sends a request to a configuration server and downloads and installs a configuration.</p>
Options	The remaining statements are explained separately.
Required Privilege Level	<p>system—To view this statement in the configuration.</p> <p>system-control—To add this statement to the configuration.</p>
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>show system autoinstallation status</i>• <i>Upgrading Software Using Automatic Software Download</i>• <i>J Series Services Router Basic LAN and WAN Access Configuration Guide</i>• configuration-servers on page 138• <i>idle-timeout</i>


backup-router

Syntax	<code>backup-router <i>address</i> <destination <i>destination-address</i>>;</code>
Hierarchy Level	[edit system]
Release Information	Statement introduced before Junos OS Release 7.4.
Description	Set a default router (running IP version 4 [IPv4]) to use while the local router (running IPv4) is booting and if the routing protocol processes fail to start. The Junos OS removes the route to this router as soon as the software starts.
Options	<p><i>address</i>—Address of the default router.</p> <p><i>destination destination-address</i>—(Optional) Destination address that is reachable through the backup router. You can include this option to achieve network reachability while loading, configuring, and recovering the router, but without the risk of installing a default route in the forwarding table.</p> <p>Default: All hosts (default route) are reachable through the backup router.</p>
Required Privilege Level	<p>system—To view this statement in the configuration.</p> <p>system-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none">• Configuring a Backup Router on page 69

commit (System)

Syntax	<pre>commit { commit fast-synchronize; persist-groups-inheritance ; server; commit synchronize; }</pre>
Hierarchy Level	[edit system]
Release Information	Statement introduced in Junos OS Release 7.4. Option persist-groups-inheritance added in Junos OS Release 13.2
Description	Configure statements for Junos OS commit. Each of the statements are described separately.
Options	<p>and-quit—(Optional) Quit configuration mode if the commit synchronization succeeds.</p> <p>at—(Optional) Time at which to activate configuration changes.</p> <p>comment—(Optional) Write a message to the commit log.</p> <p>force—(Optional) Force a commit synchronization on the other Routing Engine (ignore warnings).</p> <p>scripts—(Optional) Push scripts to the other Routing Engine.</p>
Required Privilege Level	<p>maintenance—To view this statement in the configuration.</p> <p>maintenance-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none">• commit fast-synchronize on page 142• persist-groups-inheritance on page 154• server on page 164• synchronize on page 167

compress-configuration-files (System)

Syntax	(compress-configuration-files no-compress-configuration-files);
Hierarchy Level	[edit system]
Release Information	Statement introduced before Junos OS Release 7.4.
Description	<p>Compress the current operational configuration file. By default, the current operational configuration file is compressed, and is stored in the file juniper.conf, in the /config file system, along with the last three committed versions of the configuration. However, with large networks, the current configuration file might exceed the available space in the /config file system. Compressing the current configuration file allows the file to fit in the file system, typically reducing the size of the file by 90 percent. The current configuration file is compressed on the second commit of the configuration after the first commit is made to include the compress-configuration-files statement.</p>
	<div>  <p>NOTE: We recommend that you enable compression of the router configuration files to minimize the amount of disk space that they require.</p> </div>
Default	The current operational configuration file is uncompressed.
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"> • Compressing the Current Configuration File on page 85

configuration

Syntax

```
configuration {  
  transfer-interval interval;  
  transfer-on-commit;  
  archive-sites {  
    file://<path>/<filename>;  
    ftp://username@host:<port>url-path password password;  
    http://username@host:<port>url-path password password;  
    pasvftp://username@host:<port>url-path password password;  
    scp://username@host:<port>url-path password password;  
  }  
}
```

Hierarchy Level [edit system archival]

Release Information Statement introduced before Junos OS Release 7.4.
Statement introduced in Junos OS Release 9.0 for EX Series switches.
Statement introduced in Junos OS Release 11.1 for the QFX Series.

Description Configure the router or switch to periodically transfer its currently active configuration (or after each commit).



NOTE: The [edit system archival] hierarchy is not available on QFabric systems.

Options The remaining statements are explained separately.

Required Privilege Level system—To view this statement in the configuration.
system-control—To add this statement to the configuration.

Related Documentation

- [Using Junos OS to Configure a Router or Switch to Transfer Its Configuration to an Archive Site on page 73](#)
- [archive](#)
- [archive-sites on page 130](#)
- [transfer-interval on page 169](#)
- [transfer-on-commit on page 170](#)

configuration-database

Syntax	<pre>configuration-database { virtual-memory-mapping { process <i>process name</i> { fixed-size <i>size KB</i>; page-pooling-size <i>size KB</i>; } } extend-size; }</pre>
Hierarchy Level	[edit system]
Release Information	Statement introduced in Junos OS Release 13.2.
Description	<p>Increase the memory space available for the configuration database size per process, as needed, by using virtual memory mapping and page-pooling. A fixed size can be allocated for the initial portion of the database, and page-pooling can be configured to allow the configuration database to use small amounts of virtual memory by swapping pages in or out, as needed, for remaining process configurations that might temporarily exceed the fixed memory database size that is allocated. Using this method, there is no need to map the entire database into the virtual memory of the process. Only the most recently used pages are pooled (pointed to) when accessed.</p> <p>For i386 platforms on the M, MX, or T Series devices only, you can use the extend-size option to increase the memory space available for the configuration database, per process, up to 1.5 GB.</p> <p>The remaining statements are explained separately.</p>
Required Privilege Level	<p>admin—To view this statement in the configuration.</p> <p>admin-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Example: Configuring Virtual Memory for Process Configuration Data on page 116

configuration-servers

Syntax	<code>configuration-servers { url; }</code>
Hierarchy Level	[edit system autoinstallation]
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	For J Series Services Routers and EX Series switches only, configure the URL address of a server from which to obtain configuration files. Examples of URLs: <code>tftp://hostname/path/filename</code> <code>ftp://username:prompt@ftp.hostname.net/filename /</code>
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">• <i>Upgrading Software Using Automatic Software Download</i>• Getting Started Guide for your router model• autoinstallation on page 132• <i>idle-timeout</i>

domain-name

Syntax	<code>domain-name domain-name;</code>
Hierarchy Level	[edit system]
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	Configure the name of the domain in which the router or switch is located. This is the default domain name that is appended to hostnames that are not fully qualified.
Options	<i>domain-name</i> —Name of the domain.
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">• Configuring the Domain Name for the Router or Switch on page 64

domain-search

Syntax	<code>domain-search [<i>domain-list</i>];</code>
Hierarchy Level	<code>[edit system],</code> <code>[edit system services dhcp],</code> <code>[edit system services dhcp],</code> <code>[edit system services dhcp pool],</code> <code>[edit system services dhcp static-binding]</code>
Release Information	<p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p>
Description	Configure a list of domains to be searched.
Options	<i>domain-list</i> —A list of domain names to search. The list can contain up to six domain names, with a total of up to 256 characters.
Required Privilege Level	<p>system—To view this statement in the configuration.</p> <p>system-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Configuring the Domains to Search When a Router or Switch Is Included in Multiple Domains on page 65 • <i>Configuring the Router or Interface to Act as a DHCP Server on J Series Services Routers</i> • <i>Configuring a DHCP Server on EX Series Switches (CLI Procedure)</i>

dump-device

Syntax	<pre>dump-device { compact-flash; removable-compact-flash; usb; }</pre>
Hierarchy Level	[edit system]
Release Information	Statement introduced before Junos OS Release 7.4.
Description	<p>For J Series Services Routers only. Configure the medium used for storing memory snapshots of system failure. When you specify the storage and an operating system fails, the operating system writes a snapshot of the state of the router when it failed to the storage medium. When the operating system is rebooted, the storage device is checked for a snapshot. If found, the snapshot of memory is written to the <code>/var/crash</code> directory on the router and can be examined by Juniper Networks customer support to help determine the cause of failure.</p> <p>If the swap partition on the device medium is not large enough for the system memory snapshot, the snapshot is not successfully written to the directory. Use the request system snapshot command to specify the swap partition.</p>
Options	<p>compact-flash—The primary CompactFlash card.</p> <p>removable-compact-flash—The CompactFlash card on the front of the router (J4300 and J6300 only) as the system software failure memory snapshot device.</p> <p>usb—The device attached to the universal serial bus (USB) port.</p>
Required Privilege Level	<p>system—To view this statement in the configuration.</p> <p>system-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none">Getting Started Guide for your router model

events

Syntax	<code>events [<i>events</i>];</code>
Hierarchy Level	[edit system accounting]
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	Configure the types of events to track and log.
Options	<i>events</i> —Event types; can be one or more of the following: <ul style="list-style-type: none"> • change-log—Audit configuration changes. • interactive-commands—Audit interactive commands (any command-line input). • login—Audit logins.
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"> • <i>Configuring TACACS+ System Accounting</i>

extend-size

Syntax	<code>extend-size;</code>
Hierarchy Level	[edit system configuration-database]
Description	(M, MX, T i386 only) Extend the default size of the configuration database to 1.5 GB. This is only used by mgd and only in the M, MX, and T Series i386 platforms.
Required Privilege Level	admin—To view this statement in the configuration. admin-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"> • Example: Configuring Virtual Memory for Process Configuration Data on page 116

fast-synchronize

Syntax	fast-synchronize;
Hierarchy Level	[edit system commit]
Release Information	Statement introduced in Junos OS Release 12.2.
Description	Configure commits to run in parallel (simultaneously) on both the master and backup Routing Engines to reduce the time required for commit synchronization. The fast-synchronize configuration is valid only on systems with two Routing Engines.
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">• Configuring Multiple Routing Engines to Synchronize Committed Configurations Automatically on page 84• synchronize on page 167

fixed-size (Virtual Memory Mapping)

Syntax	fixed-size <i>size KB</i> ;
Hierarchy Level	[edit system configuration-database virtual-memory-mapping process <i>process name</i>]
Description	Configure a nondefault size for the fixed size memory to be used for the initial portion of the configuration database for a specific process when using virtual memory mapping to improve commit performance. This is used in conjunction with a page-pooling size set aside to swap pages in and out of virtual memory to improve commit performance.
Options	size KB —Size in kilobytes to directly map for the initial portion (fixed size) of the configuration database for the specified process. Range: Minimum 512 KB, maximum 680 MB
Required Privilege Level	admin—To view this statement in the configuration. admin-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Using Virtual Memory for Process Configuration Data on page 115• Example: Configuring Virtual Memory for Process Configuration Data on page 116• configuration-database on page 137• extend-size on page 141• virtual-memory-mapping on page 172

groups

```
Syntax  groups {
        group-name {
            configuration-data;
            when {
                chassis chassis-id;
                member member-id;
                model model-id;
                node node-id;
                routing-engine routing-engine-id;
                time <start-time> [to <end-time>];
            }
            conditional-data;
        }
        lccn-re0 {
            configuration-data;
        }
        lccn-re1 {
            configuration-data;
        }
    }
```

Hierarchy Level [edit]

Release Information Statement introduced before Junos OS Release 7.4.

Description Create a configuration group.

Options —

group-name—Name of the configuration group. To configure multiple groups, specify more than one **group-name**.

configuration-data—The configuration statements that are to be applied elsewhere in the configuration with the **apply-groups** statement, to have the target configuration inherit the statements in the group.

when conditional-data—Option introduced in Junos 11.3. The conditional statements that are to be applied when this configuration group is applied.

On routers that support multiple Routing Engines, you can also specify two special group names:

re0—Configuration statements that are to be applied to the Routing Engine in slot 0.

re1—Configuration statements that are to be applied to the Routing Engine in slot 1.

The configuration specified in group **re0** is applied only if the current Routing Engine is in slot 0; likewise, the configuration specified in group **re1** is applied only if the current Routing Engine is in slot 1. Therefore, both Routing Engines can use the same configuration file, each using only the configuration statements that apply to it. Each **re0** or **re1** group contains at a minimum the configuration for the hostname and the

management interface (**fxp0**). If each Routing Engine uses a different management interface, the group also should contain the configuration for the backup router and static routes.

(Routing matrix only) The TX Matrix router supports group names for the Routing Engines in each connected T640 router in the following formats:



NOTE: The management Ethernet interface used for the TX Matrix Plus router, T1600 routers in a routing matrix, and PTX Series Packet Transport Routers, is **em0**. Junos OS automatically creates the router's management Ethernet interface, **em0**.

- **lccn-re0**—Configuration statements applied to the Routing Engine in slot 0 of the specified T640 router that is connected to a TX Matrix router.
 - **lccn-re1**—Configuration statements applied to the specified to the Routing Engine in slot 1 of the specified T640 router that is connected to a TX Matrix router.
- n* identifies the T640 router and can be from 0 through 3.

The remaining statements are explained separately.

Required Privilege Level configure—To enter configuration mode.

Related Documentation

- [Creating a Junos Configuration Group on page 95](#)
- *apply-groups*
- *apply-groups-except*

host-name

Syntax `host-name hostname;`

Hierarchy Level [edit system]

Release Information Statement introduced before Junos OS Release 7.4.
Statement introduced in Junos OS Release 9.0 for EX Series switches.

Description Set the hostname of the router or switch.

Options *hostname*—Name of the router or switch.

Required Privilege Level system—To view this statement in the configuration.
system-control—To add this statement to the configuration.

Related Documentation

- [Configuring the Hostname of the Router or Switch on page 62](#)

inet6-backup-router

Syntax	<code>inet6-backup-router <i>address</i> <destination <i>destination-address</i>>;</code>
Hierarchy Level	[edit system]
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	Set a default router (running IP version 6 [IPv6]) to use while the local router or switch (running IPv6) is booting and if the routing protocol processes fail to start. The Junos OS removes the route to this router or switch as soon as the software starts.
Options	<p><i>address</i>—Address of the default router.</p> <p><i>destination destination-address</i>—(Optional) Destination address that is reachable through the backup router. You can include this option to achieve network reachability while loading, configuring, and recovering the router or switch, but without the risk of installing a default route in the forwarding table.</p> <p>Default: All hosts (default route) are reachable through the backup router.</p>
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">• Configuring a Backup Router on page 69

interfaces

Syntax	<pre>interfaces { interface-name { bootp; rarp; slarp; } }</pre>
Hierarchy Level	[edit system autoinstallation]
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	For J Series Services Routers and EX Series switches only. Configure the interface on which to perform autoinstallation. A request for an IP address is sent from the interface. Specify the IP address procurement protocol.
Options	rarpbootp —Send requests over serial interfaces with Frame Relay. rarp —Send requests over Ethernet interfaces. slarp —(On J Series Services Routers only) Send requests over serial interfaces with HDLC.
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">• <i>Upgrading Software Using Automatic Software Download</i>• <i>J Series Services Router Basic LAN and WAN Access Configuration Guide</i>• autoinstallation on page 132

load-key-file

Syntax	<code>load-key-file URL filename;</code>
Hierarchy Level	[edit system root-authentication], [edit system login user <i>username</i> authentication]
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches. Statement introduced in Junos OS Release 11.1 for the QFX Series.
Description	Load RSA (SSH version 1 and SSH version 2) and DSA or ECDSA (SSH version 2) public keys from a previously-generated named file at a specified URL location. The file contains one or more SSH keys that are copied into the configuration when the command is issued.
Required Privilege Level	admin—To view this statement in the configuration. admin-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Configuring the Root Password on page 76• <i>Configuring the Root Password</i>• <i>Configuring Junos OS User Accounts</i>• <i>Configuring Junos OS User Accounts</i>

location (System)

Syntax	<pre>location { altitude <i>feet</i>; building <i>name</i>; country-code <i>code</i>; floor <i>number</i>; hcoord <i>horizontal-coordinate</i>; lata <i>service-area</i>; latitude <i>degrees</i>; longitude <i>degrees</i>; npa-nxx <i>number</i>; postal-code <i>postal-code</i>; rack <i>number</i>; vcoord <i>vertical-coordinate</i>; }</pre>
Hierarchy Level	[edit system]
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	Configure the system location in various formats.
Options	<p>altitude <i>feet</i>—Number of feet above sea level.</p> <p>building <i>name</i>—Name of building. The name of the building can be 1 to 28 characters in length. If the string contains spaces, enclose it in quotation marks (" ").</p> <p>country-code <i>code</i>—Two-letter country code.</p> <p>floor <i>number</i>—Floor in the building.</p> <p>hcoord <i>horizontal-coordinate</i>—Bellcore Horizontal Coordinate.</p> <p>lata <i>service-area</i>—Long-distance service area.</p> <p>latitude <i>degrees</i>—Latitude in degree format.</p> <p>longitude <i>degrees</i>—Longitude in degree format.</p> <p>npa-nxx <i>number</i>—First six digits of the phone number (area code and exchange).</p> <p>postal-code <i>postal-code</i>—Postal code.</p> <p>rack <i>number</i>—Rack number.</p> <p>vcoord <i>vertical-coordinate</i>—Bellcore Vertical Coordinate.</p>
Required Privilege Level	system—To view this statement in the configuration. system-control—To add this statement to the configuration.

- Related Documentation**
- [Configuring the Physical Location of the Router or Switch on page 75](#)

login-tip

Syntax	login-tip;
Hierarchy Level	[edit system login class <i>class-name</i>]
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	Enable CLI tips at login.
Default	Disabled.
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"> • Configuring CLI Tips on page 50



max-configurations-on-flash

Syntax	max-configurations-on-flash <i>number</i> ;
Hierarchy Level	[edit system]
Release Information	Statement introduced before Junos OS Release 7.4.
Description	Specify the number of configurations stored on the CompactFlash card.
Options	<p><i>number</i>—The number of configurations stored on the CompactFlash card.</p> <p>Range: 0 through 49. The most recently saved configuration is number 0, and the oldest saved configuration is number 49.</p>
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"> • Using Junos OS to Specify the Number of Configurations Stored on the CompactFlash Card on page 72

message

Syntax	<code>message <i>text</i>;</code>
Hierarchy Level	[edit system login]
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	<p>Configure a system login message. This message appears before a user logs in.</p> <p>You can format the message using the following special characters:</p> <ul style="list-style-type: none">• \n—New line• \t—Horizontal tab• \'—Single quotation mark• \"—Double quotation mark• \\—Backslash
Options	<i>text</i> —Text of the message.
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">• Configuring the Junos OS to Display a System Login Message on page 87• announcement on page 128

mirror-flash-on-disk

Syntax	mirror-flash-on-disk;
Hierarchy Level	[edit system]
Release Information	Statement introduced before Junos OS Release 7.4.
Description	<p>Configure the hard disk to automatically mirror the contents of the CompactFlash card. The hard disk maintains a synchronized mirror copy of the CompactFlash card contents. Data written to the CompactFlash card is simultaneously updated in the mirrored copy of the hard disk. If the CompactFlash card fails to read data, the hard disk automatically retrieves its mirrored copy of the CompactFlash card. This command is not available on the J Series routers.</p> <div>  <p>CAUTION: We recommend that you disable flash disk mirroring when you upgrade or downgrade the router.</p> <p>You cannot issue the <code>request system snapshot</code> command while the <code>mirror-flash-on-disk</code> statement is enabled.</p> </div> <div>  <p>NOTE: After you have enabled or disabled the <code>mirror-flash-on-disk</code> statement, you must reboot the router for your changes to take effect. To reboot, issue the <code>request system reboot</code> command.</p> </div>
Required Privilege Level	<p>system—To view this statement in the configuration.</p> <p>system-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Configuring Automatic Mirroring of the CompactFlash Card on the Hard Disk Drive on page 71

name-server

Syntax	<code>name-server { <code>address</code>; }</code>
Hierarchy Level	[edit system], [edit system services dhcp], [edit system services dhcp], [edit system services dhcp pool], [edit system services dhcp static-binding]
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	Configure one or more Domain Name System (DNS) name servers.
Options	<code>address</code> —Address of the name server. To configure multiple name servers, include a maximum of three <code>address</code> options.
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">• Configuring a DNS Name Server for Resolving a Hostname into Addresses on page 65• <i>Configuring the Router or Interface to Act as a DHCP Server on J Series Services Routers</i>• <i>Configuring a DHCP Server on EX Series Switches (CLI Procedure)</i>

page-pooling-size (Virtual Memory Mapping)

Syntax	<code>page-pooling-size size KB;</code>
Hierarchy Level	[edit system configuration-database virtual-memory-mapping process <i>process name</i>]
Description	Configure a page-pooling size to use to swap pages in and out of virtual memory for a specific process when using virtual memory mapping to improve commit performance. This is used in conjunction with a fixed size memory to be used for the initial portion of the configuration database.
Options	size KB —Size in kilobytes to use for page-pooling the remaining data in the database. Range: Minimum 512 KB, maximum 680 MB
Required Privilege Level	admin—To view this statement in the configuration. admin-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Using Virtual Memory for Process Configuration Data on page 115• Example: Configuring Virtual Memory for Process Configuration Data on page 116• configuration-database on page 137• extend-size on page 141• virtual-memory-mapping on page 172

password (Proxy Systems)

Syntax	<code>password password;</code>
Hierarchy Level	[edit system proxy]
Release Information	Statement introduced in Junos OS Release 11.4.
Description	Configure the proxy server parameters for a device.
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">• Example: Configuring a Proxy Server for License Updates on page 66

`persist-groups-inheritance`

Syntax	<code>persist-groups-inheritance;</code>
Hierarchy Level	[edit system commit]
Release Information	Statement introduced in Junos OS Release 13.2.
Description	Configure this option to improve commit performance for systems that use many configuration groups that use wildcards. This option causes the full inheritance paths of the configuration groups to be built in the database instead of in the process memory.
Options	There are no options for this configuration.
Required Privilege Level	admin—To view this statement in the configuration. admin-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Improving Commit Time When Using Configuration Groups on page 110

pic-console-authentication

Syntax	<pre>pic-console authentication { (encrypted-password "password" plain-text-password); }</pre>
Hierarchy Level	[edit system]
Release Information	Statement introduced before Junos OS Release 7.4.
Description	Configure console access to Physical Interface Cards (PICs).
Default	Disabled. By default, there is no password setting for console access.
Options	<p>encrypted-password "password"—Use MD5 or other encrypted authentication. Specify the MD5 or other password. You can specify only one encrypted password.</p> <p>You cannot configure a blank password for encrypted-password using blank quotation marks (" "). You must configure a password whose number of characters range from 1 through 128 characters and enclose the password in quotation marks.</p> <p>plain-text-password—Use a plain-text password. The CLI prompts you for the password and then encrypts it. The CLI displays the encrypted version, and the software places the encrypted version in its user database. You can specify only one plain-text password.</p> <p>The default requirements for plain-text passwords are:</p> <ul style="list-style-type: none"> • The password must be between 6 and 128 characters long • You can include most character classes in a password (uppercase letters, lowercase letters, numbers, punctuation marks, and other special characters). Control characters are not recommended. • Valid passwords must contain at least one change of case or character class.
Required Privilege Level	<p>admin—To view this statement in the configuration.</p> <p>admin-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Configuring the Junos OS to Set Console and Auxiliary Port Properties on page 83 • Configuring Password Authentication for Console Access to PICs

port (Syslog)

Syntax	<code>port <i>port number</i>;</code>
Hierarchy Level	[edit system syslog host <i>hostname</i> other-routing-engine scc-master)]
Release Information	Statement introduced in Junos OS Release 11.3.
Description	Specify the port number for the remote syslog server.
Options	<i>port number</i> —Port number of the remote syslog server. Range: 0 through 65535 Default: 514
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">• <i>syslog</i>• <i>host</i>

port (Proxy Server)

Syntax	<code>port <i>port-number</i>;</code>
Hierarchy Level	[edit system proxy]
Release Information	Statement introduced in Junos OS Release 11.4.
Description	Configure the port number for the proxy server ranging from 0 through 65535 .
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">• Example: Configuring a Proxy Server for License Updates on page 66


ports

Syntax	<pre> ports { auxiliary { disable; insecure; type <i>terminal-type</i>; port-type (mini-usb rj45); } console { disable; insecure; log-out-on-disconnect; type <i>terminal-type</i>; } } </pre>
Hierarchy Level	[edit system]
Release Information	<p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p>
Description	<p>Configure the properties of the console and auxiliary ports. The ports are located on the router's craft interface.</p> <p>See the switch's hardware documentation for port locations.</p> <p>The remaining statements are explained separately.</p>
Required Privilege Level	<p>system—To view this statement in the configuration.</p> <p>system-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Configuring the Junos OS to Set Console and Auxiliary Port Properties on page 83

process (Virtual Memory Mapping)

Syntax	<pre>process process name { fixed-size size; page-pooling-size size; }</pre>
Hierarchy Level	[edit system configuration-database virtual-memory-mapping]
Description	Configure parameters on a per-process basis for using virtual memory mapping for the configuration database. Configure a nondefault size for the fixed size memory to be used for the initial portion of the configuration database for a specific process. Also configure a page-pooling size to be used to access virtual memory as needed by implementing page-pooling.
Options	<p>fixed-size size KB—Size in kilobytes to directly map for the initial portion of the configuration database for the specified process. Range: Minimum 512 KB, maximum 680 MB</p> <p>page-pooling-size size KB—Size in kilobytes to use for page-pooling the remaining data in the database. Range: Minimum 512 KB, maximum 680 MB</p>
Required Privilege Level	admin—To view this statement in the configuration. admin-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Using Virtual Memory for Process Configuration Data on page 115• Example: Configuring Virtual Memory for Process Configuration Data on page 116• configuration-database on page 137• extend-size on page 141• virtual-memory-mapping on page 172

processes

Syntax	<pre>processes { process-name (enable disable) failover (alternate-media other-routing-engine); timeout seconds; }</pre>
Hierarchy Level	[edit system]
Release Information	<p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p>
Description	Configure which Junos OS processes are running on the router or switch.
	<div>  <p>CAUTION: Never disable any of the software processes unless instructed to do so by a customer support engineer.</p> </div>
Default	All processes are enabled by default.
Options	<p>(enable disable)—(Optional) Enable or disable a specified process.</p> <p>failover (alternate-media other-routing-engine)—(Optional) For routers or switches with redundant Routing Engines only, switch to backup media if a process fails repeatedly. If a process fails four times within 30 seconds, the router or switch reboots from the alternate media or the other Routing Engine.</p> <p>process-name—One of the valid process names. You can obtain a complete list of process names by using the CLI command completion feature. After specifying a process name, command completion also indicates any additional options for that process.</p> <p>timeout seconds—(Optional) How often the system checks the watchdog timer, in seconds. If the watchdog timer has not been checked in the specified number of seconds, the system reloads. If you set the time value too low, it is possible for the system to reboot immediately after it loads.</p> <p>Values: 15, 60, or 180</p> <p>Default: 180 seconds (rounded up to 291 seconds by the Junos kernel)</p>
Required Privilege Level	<p>system—To view this statement in the configuration.</p> <p>system-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> Disabling Junos OS Processes on page 113

proxy (System)

Syntax	<pre>proxy { server (<i>hostname</i> <i>ip-address</i>); port <i>port-number</i>; username <i>username</i>; password <i>password</i>; }</pre>
Hierarchy Level	[edit system]
Release Information	Statement introduced in Junos OS Release 11.4.
Description	<p>Configure the proxy server properties for a device.</p> <p>The remaining statements are explained separately.</p>
Required Privilege Level	<p>system—To view this statement in the configuration.</p> <p>system-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none">• Example: Configuring a Proxy Server for License Updates on page 66

root-authentication

Syntax	<pre> root-authentication { (encrypted-password "password" plain-text-password); ssh-dsa "public-key"; ssh-ecdsa "public-key"; ssh-rsa "public-key"; } </pre>
Hierarchy Level	[edit system]
Release Information	<p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p>
Description	Configure the authentication methods for the root-level user, whose username is root .
Options	<p>encrypted-password "password"— MD5 or other encrypted authentication. Specify the MD5 or other password. You can specify only one encrypted password.</p> <p>You cannot configure a blank password for encrypted-password using blank quotation marks (" "). You must configure a password whose number of characters range from 1 through 128 characters and enclose the password in quotation marks.</p> <p>plain-text-password—Plain-text password. The CLI prompts you for the password and then encrypts it. The CLI displays the encrypted version, and the software places the encrypted version in its user database. You can specify only one plain-text password.</p> <p>ssh-dsa "public-key"—SSH version 2 authentication. Specify the DSA (SSH version 2) public key. You can specify one or more public keys.</p> <p>ssh-rsa "public-key"—SSH version 1 authentication. Specify the RSA (SSH version 1 and SSH version 2) public key. You can specify one or more public keys.</p>
Required Privilege Level	<p>admin—To view this statement in the configuration.</p> <p>admin-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Configuring the Root Password on page 76 • <i>authentication</i>

root-login

Syntax	root-login (allow deny deny-password);
Hierarchy Level	[edit system services ssh]
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches. Statement introduced in Junos OS Release 11.1 for the QFX Series.
Description	Control user access through SSH.
Default	Allow user access through SSH.
Options	allow —Allow users to log in to the router or switch as root through SSH. deny —Disable users from logging in to the router or switch as root through SSH. deny-password —Allow users to log in to the router or switch as root through SSH when the authentication method (for example, RSA authentication) does not require a password.
Required Privilege Level	admin—To view this statement in the configuration. admin-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• <i>Configuring SSH Service for Remote Access to the Router or Switch</i>

saved-core-context

Syntax	(saved-core-context no-saved-core-context);
Hierarchy Level	[edit system]
Release Information	Statement introduced before Junos OS Release 7.4.
Description	<p>Configure whether the router saves core files generated by internal Junos processes, along with contextual information (system log files and a copy of the current configuration):</p> <ul style="list-style-type: none"> • saved-core-context—The router saves each cores file and its associated context in a compressed tar file named <code>/var/tmp/process-name.core.core-number.tgz</code>. • no-saved-core-context—The router does not save cores files and their associated context. <p>The router saves core files.</p>
Required Privilege Level	<p>admin—To view this statement in the configuration.</p> <p>admin-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Saving Core Files from Junos OS Processes on page 114 • saved-core-files on page 163

saved-core-files

Syntax	saved-core-files <i>number</i> ;
Hierarchy Level	[edit system]
Release Information	Statement introduced before Junos OS Release 7.4.
Description	Save core files generated by internal Junos processes, but not the associated contextual information (configuration and system log files).
Options	<p>number—Maximum number of core files to save.</p> <p>Range: 1 through 10</p>
Required Privilege Level	<p>admin—To view this statement in the configuration.</p> <p>admin-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Saving Core Files from Junos OS Processes on page 114 • saved-core-context on page 163

server (Batch Commits)

Syntax	<pre>server { commit-interval<number-of-seconds-between-commits>; days-to-keep-error-logs<days-to-keep-error-log-entries>; maximum-aggregate-pool<maximum-number-of-commits-to-aggregate>; maximum-entries <number-of-entries>; traceoptions { file filename; files number; flag (all batch commit-server configuration); size maximum-file-size; (world-readable no-world-readable); } }</pre>
Hierarchy Level	[edit system commit]
Release Information	Statement introduced in Junos OS Release 12.1.
Description	Configure the system commit to occur in batches. Configure parameters for aggregating and saving batch commits.
Options	<p><i>commit-interval</i>—Configure the interval between commits.</p> <p><i>days-to-keep-error-logs</i>—Configure the number of days to keep log entries.</p> <p><i>maximum-aggregate-pool</i>—Configure the maximum number of commits to aggregate together.</p> <p><i>maximum-entries</i> —Configure the maximum number of commit entries.</p>
Required Privilege Level	<p>system—To view this statement in the configuration.</p> <p>system-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none">• <i>Example: Configuring Batch Commit Server Properties</i>

server (Proxy)

Syntax	<code>server (hostname ip-address);</code>
Hierarchy Level	[edit system proxy]
Release Information	Statement introduced in Junos OS Release 11.4.
Description	Configure the proxy server name or IP address.
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">• Example: Configuring a Proxy Server for License Updates on page 66

server (Proxy)

Syntax	<code>server (hostname ip-address);</code>
Hierarchy Level	[edit system proxy]
Release Information	Statement introduced in Junos OS Release 11.4.
Description	Configure the proxy server name or IP address.
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">• Example: Configuring a Proxy Server for License Updates on page 66

static-host-mapping

Syntax	<pre>static-host-mapping { hostname { alias [<i>aliases</i>]; inet [<i>addresses</i>]; sysid <i>system-identifier</i>; } }</pre>
Hierarchy Level	[edit system]
Release Information	Statement introduced before Junos OS Release 7.4.
Description	Map a hostname to one or more IP addresses and aliases, and configure an International Organization for Standardization (ISO) system identifier (system ID).
Options	<p>alias <i>alias</i>—Alias for the hostname.</p> <p>hostname—Fully qualified hostname.</p> <p>inet <i>address</i>—IP address. You can specify one or more IP addresses for the host.</p> <p>sysid <i>system-identifier</i>—ISO system identifier (system ID). This is the 6-byte portion of the Intermediate System-to-Intermediate System (IS-IS) network service access point (NSAP). We recommend that you use the host's IP address represented in binary-coded decimal (BCD) format. For example, the IP address 208.197.169.18 is 2081.9716.9018 in BCD.</p>
Required Privilege Level	<p>system—To view this statement in the configuration.</p> <p>system-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none">• Configuring the Hostname of the Router or Switch on page 62

synchronize

Syntax	synchronize;
Hierarchy Level	[edit system commit]
Release Information	Statement introduced in Junos OS Release 7.4. Statement introduced in Junos OS Release 10.4 for EX Series switches.
Description	For devices with multiple Routing Engines only. Configure the commit command to automatically perform a commit synchronize action between dual Routing Engines within the same chassis. The Routing Engine on which you execute the commit command (the requesting Routing Engine) copies and loads its candidate configuration to the other (the responding) Routing Engine. Each Routing Engine then performs a syntax check on the candidate configuration file being committed. If no errors are found, the configuration is activated and becomes the current operational configuration on both Routing Engines.



NOTE: When you configure nonstop active routing (NSR), you must configure the **commit synchronize** statement. Otherwise, the commit operation fails.

On the TX Matrix router, synchronization only occurs between the Routing Engines within the same chassis. When synchronization is complete, the new configuration is then distributed to the Routing Engines on the T640 routers. That is, the master Routing Engine on the TX Matrix router distributes the configuration to the master Routing Engine on each T640 router. Likewise, the backup Routing Engine on the TX Matrix router distributes the configuration to the backup Routing Engine on each T640 router.

On the TX Matrix Plus router and TX Matrix Plus router with 3D SIBs, synchronization only occurs between the Routing Engines within the switch-fabric chassis and when synchronization is complete, the new configuration is then distributed to the Routing Engines on the line-card chassis (LCC). That is, the master Routing Engine on the TX Matrix Plus router distributes the configuration to the master Routing Engine on each LCC. Likewise, the backup Routing Engine on the TX Matrix Plus router distributes the configuration to the backup Routing Engine on each LCC.

In EX Series Virtual Chassis configurations:

- On EX4200 switches in Virtual Chassis, synchronization occurs between the switch in the master role and the switch in the backup role.
- On EX8200 switches in a Virtual Chassis, synchronization occurs only between the master and backup XRE200 External Routing Engines.

Options	and-quit —(Optional) Quit configuration mode if the commit synchronization succeeds.
	at —(Optional) Time at which to activate configuration changes.
	comment —(Optional) Write a message to the commit log.

force—(Optional) Force a commit synchronization on the other Routing Engine (ignore warnings).

scripts—(Optional) Push scripts to the other Routing Engine.

Required Privilege Level system—To view this statement in the configuration.
 system-control—To add this statement to the configuration.

Related Documentation

- [Synchronizing the Routing Engine Configuration](#)
- [Configuring Multiple Routing Engines to Synchronize Committed Configurations Automatically on page 84](#)

system

Syntax system { ... }

Hierarchy Level [edit]

Release Information Statement introduced before Junos OS Release 7.4.
 Statement introduced in Junos OS Release 9.0 for EX Series switches.

Description Configure system management properties.

Required Privilege Level system—To view this statement in the configuration.
 system-control—To add this statement to the configuration.

Related Documentation

- [System Management Configuration Statements on page 121](#)

transfer-interval (Configuration)

Syntax	<code>transfer-interval <i>interval</i>;</code>
Hierarchy Level	[edit system archival configuration]
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches. Statement introduced in Junos OS Release 11.1 for the QFX Series.
Description	Configure the router or switch to periodically transfer its currently active configuration to an archive site.



NOTE: The `edit system archival` hierarchy is not available on QFabric systems.

Options	<i>interval</i> —Interval at which to transfer the current configuration to an archive site. Range: 15 through 2880 minutes
----------------	---



NOTE: The `[edit system archival]` hierarchy is not available on QFabric systems.

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"> • Configuring the Transfer Interval for Periodic Transfer of the Active Configuration to an Archive Site on page 73 • archive • configuration on page 136 • transfer-on-commit on page 170

transfer-on-commit

Syntax	transfer-on-commit;
Hierarchy Level	[edit system archival configuration]
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches. Statement introduced in Junos OS Release 11.1 for the QFX Series.
Description	Configure the router or switch to transfer its currently active configuration to an archive site each time you commit a candidate configuration.



NOTE: When specifying a URL in a Junos OS statement using an IPv6 host address, you must enclose the entire URL in quotation marks (" ") and enclose the IPv6 host address in brackets ([]). For example, "ftp://username<:password>@[ipv6-host-address]<:port>/url-path" .



NOTE: The [edit system archival] hierarchy is not available on QFabric systems.

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">• Configuring Transfer of the Current Active Configuration When a Configuration Is Committed on page 74• archive• configuration on page 136• transfer-interval on page 169

trusted-key

Syntax	<code>trusted-key [<i>key-numbers</i>];</code>
Hierarchy Level	<code>[edit system ntp]</code>
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	For NTP, configure the keys you are allowed to use when you configure the local router or switch to synchronize its time with other systems on the network.
Options	<i>key-numbers</i> —One or more key numbers. Each key can be any 32-bit unsigned integer except 0.
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"> • <i>Configuring NTP Authentication Keys</i> • <i>authentication-key</i> • <i>broadcast</i> • <i>peer</i> • <i>server</i>

username (System)

Syntax	<code>username <i>username</i>;</code>
Hierarchy Level	<code>[edit system proxy]</code>
Release Information	Statement introduced in Junos OS Release 11.4.
Description	Configure the username as configured in the proxy server.
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"> • Example: Configuring a Proxy Server for License Updates on page 66

virtual-memory-mapping

Syntax	<pre>virtual-memory-mapping { process process name { fixed-size size KB; page-pooling-size size KB; } }</pre>
Hierarchy Level	[edit system configuration-database]
Description	Define parameters for using virtual memory mapping for the configuration database on a per-process basis. You can define a fixed size for the initial portion of the database and a page-pooling size for the remaining portion of the database. The page-pooling portion s page pointers in and out as needed.
Options	<p>fixed-size size KB—Size in kilobytes to directly map for the initial portion of the configuration database for the specified process. Range: Minimum 512 KB, maximum 680 MB</p> <p>page-pooling-size size KB—Size in kilobytes to use for page-pooling the remaining data in the database. Range: Minimum 512 KB, maximum 680 MB</p>
Required Privilege Level	admin—To view this statement in the configuration. admin-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Using Virtual Memory for Process Configuration Data on page 115• Example: Configuring Virtual Memory for Process Configuration Data on page 116• configuration-database on page 137• extend-size on page 141• process on page 158

PART 3

Administration

- [File Management Commands on page 175](#)
- [System Software Administrative Commands on page 193](#)
- [System Software Monitoring Commands on page 249](#)

CHAPTER 9

File Management Commands

file archive

Syntax	<code>file archive destination <i>destination</i> source <i>source</i> <compress></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	Archive, and optionally compress, one or multiple local system files as a single file, locally or at a remote location.
Options	<p>destination <i>destination</i>—Destination of the archived file or files. Specify the destination as a URL or filename. The Junos OS adds one of the following suffixes if the destination filename does not already have it:</p> <ul style="list-style-type: none">• For archived files—The suffix .tar• For archived and compressed files—The suffix .tgz <p>source <i>source</i>—Source of the original file or files. Specify the source as a URL or filename.</p> <p>compress—(Optional) Compress the archived file with the GNU zip (gzip) compression utility. The compressed files have the suffix .tgz.</p>
Required Privilege Level	maintenance
List of Sample Output	file archive (Multiple Files) on page 177 file archive (Single File) on page 177 file archive (with Compression) on page 177
Output Fields	When you enter this command, you are provided feedback on the status of your request.

Sample Output

file archive (Multiple Files)

The following sample command archives all message files in the local directory **/var/log/messages** as the single file **messages-archive.tar**.

```
user@host> file archive source /var/log/messages* destination /var/log/messages-archive.tar
/usr/bin/tar: Removing leading / from absolute path names in the archive.
user@host>
```

file archive (Single File)

The following sample command archives one message file in the local directory **/var/log/messages** as the single file **messages-archive.tar**.

```
user@host> file archive source /var/log/messages destination /var/log/messages-archive.tar
/usr/bin/tar: Removing leading / from absolute path names in the archive.
user@host
```

file archive (with Compression)

The following sample command archives and compresses all message files in the local directory **/var/log/messages** as the single file **messages-archive.tgz**.

```
user@host> file archive compress source /var/log/messages* destination
/var/log/messages-archive.tgz
/usr/bin/tar: Removing leading / from absolute path names in the archive.
```

file checksum md5

Syntax	<code>file checksum md5 <pathname> filename</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	Calculate the Message Digest 5 (MD5) checksum of a file.
Options	pathname —(Optional) Path to a filename. filename —Name of a local file for which to calculate the MD5 checksum.
Required Privilege Level	maintenance
Related Documentation	<ul style="list-style-type: none">• <i>Configuring Checksum Hashes for a Commit Script</i> in the <i>Junos OS Configuration and Operations Automation Guide</i>• <i>Configuring Checksum Hashes for an Event Script</i> in the <i>Junos OS Configuration and Operations Automation Guide</i>• <i>Configuring Checksum Hashes for an Op Script</i> in the <i>Junos OS Configuration and Operations Automation Guide</i>• <i>Executing an Op Script from a Remote Site</i> in the <i>Junos OS Configuration and Operations Automation Guide</i>• file checksum sha-256 on page 180• file checksum sha1 on page 179• <i>op</i>
List of Sample Output	file checksum md5 on page 178
Output Fields	When you enter this command, you are provided feedback on the status of your request.

Sample Output

file checksum md5 user@host> file checksum md5 jbundle-5.3R2.4-export-signed.tgz
MD5 (jbundle-5.3R2.4-export-signed.tgz) = 2a3b69e43f9bd4893729cc16f505a0f5

file checksum sha1

Syntax	<code>file checksum sha1 <pathname> filename</code>
Release Information	<p>Command introduced in Junos OS Release 9.5.</p> <p>Command introduced in Junos OS Release 9.5 for EX Series switches.</p> <p>Command introduced in Junos OS Release 11.1 for the QFX Series.</p>
Description	Calculate the Secure Hash Algorithm (SHA-1) checksum of a file.
Options	<p>pathname—(Optional) Path to a filename.</p> <p>filename—Name of a local file for which to calculate the SHA-1 checksum.</p>
Required Privilege Level	maintenance
Related Documentation	<ul style="list-style-type: none"> • <i>Configuring Checksum Hashes for a Commit Script</i> in the <i>Junos OS Configuration and Operations Automation Guide</i> • <i>Configuring Checksum Hashes for an Event Script</i> in the <i>Junos OS Configuration and Operations Automation Guide</i> • <i>Configuring Checksum Hashes for an Op Script</i> in the <i>Junos OS Configuration and Operations Automation Guide</i> • <i>Executing an Op Script from a Remote Site</i> in the <i>Junos OS Configuration and Operations Automation Guide</i> • file checksum md5 on page 178 • file checksum sha-256 on page 180 • <i>op</i>
List of Sample Output	file checksum sha1 on page 179
Output Fields	When you enter this command, you are provided feedback on the status of your request.

Sample Output

```
file checksum sha1      user@host> file checksum sha1 /var/db/scripts/opscript.slax

SHA1 (/var/db/scripts/commitscript.slax) = ba9e47120c7ce55cff29afd73eacd370e162c676
```

file checksum sha-256

Syntax	<code>file checksum sha-256 <pathname> filename</code>
Release Information	Command introduced in Junos OS Release 9.5. Command introduced in Junos OS Release 9.5 for EX Series switches. Command introduced in Junos OS Release 11.1 for the QFX Series.
Description	Calculate the Secure Hash Algorithm 2 family (SHA-256) checksum of a file.
Options	pathname —(Optional) Path to a filename. filename —Name of a local file for which to calculate the SHA-256 checksum.
Required Privilege Level	maintenance
Related Documentation	<ul style="list-style-type: none">• <i>Configuring Checksum Hashes for a Commit Script</i> in the <i>Junos OS Configuration and Operations Automation Guide</i>• <i>Configuring Checksum Hashes for an Event Script</i> in the <i>Junos OS Configuration and Operations Automation Guide</i>• <i>Configuring Checksum Hashes for an Op Script</i> in the <i>Junos OS Configuration and Operations Automation Guide</i>• <i>Executing an Op Script from a Remote Site</i> in the <i>Junos OS Configuration and Operations Automation Guide</i>• file checksum md5 on page 178• file checksum sha1 on page 179• <i>op</i>
List of Sample Output	file checksum sha-256 on page 180
Output Fields	When you enter this command, you are provided feedback on the status of your request.

Sample Output

```
file checksum sha-256 user@host> file checksum sha-256 /var/db/scripts/commitscript.slax

SHA256 (/var/db/scripts/commitscript.slax) =
94c2b061fb55399e15babd2529453815601a602b5c98e5c12ed929c9d343dd71
```

file compare

Syntax	<pre>file compare (files <i>filename filename</i>) <context unified> <ignore-white-space></pre>
Release Information	<p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Command introduced in Junos OS Release 11.1 for the QFX Series.</p>
Description	<p>Compare two local files and describe the differences between them in default, context, or unified output styles:</p> <ul style="list-style-type: none"> • Default—In the first line of output, c means lines were changed between the two files, d means lines were deleted between the two files, and a means lines were added between the two files. The numbers preceding this alphabetical marker represent the first file, and the lines after the alphabetical marker represent the second file. A left angle bracket (<) in front of output lines refers to the first file. A right angle bracket (>) in front of output lines refers to the second file. • Context—The display is divided into two parts. The first part is the first file; the second part is the second file. Output lines preceded by an exclamation point (!) have changed. Additions are marked with a plus sign (+), and deletions are marked with a minus sign (-). • Unified—The display is preceded by the line number from the first and the second file (xx,xxx,x). Before the line number, additions to the file are marked with a plus sign (+), and deletions to the file are marked with a minus sign (-). The body of the output contains the affected lines. Changes are viewed as additions plus deletions.
Options	<p>files <i>filename</i>—Names of two local files to compare.</p> <p>context—(Optional) Display output in context format.</p> <p>ignore-white-space—(Optional) Ignore changes in the amount of white space.</p> <p>unified—(Optional) Display output in unified format.</p>
Required Privilege Level	none
List of Sample Output	<p>file compare files on page 182</p> <p>file compare files context on page 182</p> <p>file compare files unified on page 182</p> <p>file compare files unified ignore-white-space on page 182</p>
Output Fields	When you enter this command, you are provided feedback on the status of your request.

Sample Output

file compare files

```
user@host> file compare files /tmp/one /tmp/two
100c100
<          full-name "File 1";
---
>          full-name "File 2";
102c102
<          class foo; # 'foo' is not defined
---
>          class super-user;
```

file compare files context

```
user@host> file compare files /tmp/one /tmp/two context
*** /tmp/one   Wed Dec  3 17:12:50 2003
--- /tmp/two   Wed Dec  3 09:13:14 2003
*****
*** 97,104 ****
        }
    }
    user bill {
!       full-name "Bill Smith";
!       class foo; # 'foo' is not defined
        authentication {
            encrypted-password SECRET;
        }
--- 97,105 ----
    }
    user bill {
!       full-name "Bill Smith";
!       uid 1089;
!       class super-user;
        authentication {
            encrypted-password SECRET;
        }
    }
```

file compare files unified

```
user@host> file compare files /tmp/one /tmp/two unified
--- /tmp/one   Wed Dec  3 17:12:50 2003
+++ /tmp/two   Wed Dec  3 09:13:14 2003
@@ -97,8 +97,9 @@
    }
}
user bill {
-   full-name "Bill Smith";
-   class foo; # 'foo' is not defined
+   full-name "Bill Smith";
+   uid 1089;
+   class super-user;
    authentication {
        encrypted-passwordSECRET;
    }
}
```

file compare files unified ignore-white-space

```
user@host> file compare files /tmp/one /tmp/two unified ignore-white-space
--- /tmp/one   Wed Dec  3 09:13:10 2003
+++ /tmp/two   Wed Dec  3 09:13:14 2003
@@ -99,7 +99,7 @@
    user bill {
```



```
full-name "Bill Smith";  
uid 1089;  
- class foo; # 'foo' is not defined  
+ class super-user;  
  authentication {  
    encrypted-password <SECRET>; # SECRET-DATA  
  }
```

file copy

Syntax	<code>file copy <i>source destination</i></code> <code><source-address address></code>
Release Information	Command introduced before Junos OS Release 7.4. source-address option added in 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 QFX Series switches.
Description	Copy files from one location to another location on the local device or to a location on a remote device reachable by the local device.
Required Privilege Level	maintenance
Related Documentation	<ul style="list-style-type: none"> • Format for Specifying Filenames and URLs in Junos OS CLI Commands on page 40 • Default Directories for Junos OS File Storage on the Router or Switch on page 42 • Copying a Configuration File from One Routing Engine to the Other
List of Sample Output	Copy a File from the Local Device to a Personal Computer on page 184 Copy a Configuration File between Routing Engines on page 184 Copy a Log File between Routing Engines on page 184 Copy a File from a TX Matrix Plus Router to a T1600 Router Connected to the TX Matrix Plus on page 184 Copy a File Using File Transfer Protocol on page 185 Copy a File Using File Transfer Protocol and Requiring a Password on page 185 Copy a File Using Secure Copy Protocol (scp) on page 185

Sample Output

The following are examples of a variety of file copy scenarios.

Copy a File from the Local Device to a Personal Computer

```
user@host> file copy /var/tmp/rpd.core.4 mypc:/c/junipero/tmp
...transferring.file..... |           0 KB |   0.3 kB/s | ETA: 00:00:00 | 100%
```

Copy a Configuration File between Routing Engines

The following sample command copies a configuration file from Routing Engine 0 to Routing Engine 1:

```
user@host> file copy /config/juniper.conf re1:/var/tmp/copied-juniper.conf
```

Copy a Log File between Routing Engines

The following sample command copies a log file from Routing Engine 0 to Routing Engine 1:

```
user@host> file copy lcc0-re0:/var/log/chassisd lcc0-re1:/var/tmp
```

Copy a File from a TX Matrix Plus Router to a

The following sample command copies a text file from Routing Engine 1 on the switch-fabric chassis sfc0 to Routing Engine 1 on the line-card chassis lcc0:

T1600 Router Connected to the TX Matrix Plus

```
user@host> file copy sfc0-re1:/tmp/sample.txt lcc0-re1:/var/tmp
```

Copy a File Using File Transfer Protocol

To use anonymous FTP to copy a local file to a remote system, enter the following command:

```
user@host>file copy filename ftp://hostname/filename
```

In the following example, `/config/juniper.conf` is the local file and `hostname` is the FTP server:

```
user@host> file copy /config/juniper.conf ftp://hostname/juniper.conf
Receiving ftp: //hostname/juniper.conf (2198 bytes): 100%
2198 bytes transferred in 0.0 seconds (2.69 MBps)
```

Copy a File Using File Transfer Protocol and Requiring a Password

To use FTP where you require more privacy and are prompted for a password, enter the following command:

```
root@host> file copy filename ftp://user@hostname/filename
```

In the following example, `/config/juniper.conf` is the local file and `hostname` is the FTP server:

```
root@host> file copy /config/juniper.conf ftp://user@hostname/juniper.conf
Password for user@hostname: *****
Receiving ftp: //user@hostname/juniper.conf (2198 bytes): 100%
2198 bytes transferred in 0.0 seconds (2.69 MBps)
```

Copy a File Using Secure Copy Protocol (scp)

To use scp to copy a local file to a remote system, enter the following command:

```
root@host> file copy filename scp://user@hostname/path/filename
```

In the following example, `/config/juniper.conf` is the local file, `user` is the username, and `ssh-host` is the scp server:

```
root@host> file copy /config/juniper.conf scp://user@ssh-host/tmp/juniper.conf
user@ssh-host's password: *****
juniper.conf          100%
| ***** |
2198          00:00
```

file delete

Syntax	<code>file delete <i>filename</i></code> <code><purge></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	Delete a file on the local router or switch.
Options	<i>filename</i> —Name of the file to delete. For a routing matrix, include chassis information in the filename if the file to be deleted is not local to the Routing Engine from which the command is issued. <i>purge</i> —(Optional) Overwrite regular files before deleting them.
Required Privilege Level	maintenance
List of Sample Output	file delete on page 186 file delete (Routing Matrix) on page 186
Output Fields	When you enter this command, you are provided feedback on the status of your request.

Sample Output

file delete

```
user@host> file list /var/tmp
dcd.core
rpd.core
snmpd.core

user@host> file delete /var/tmp/snmpd.core
user@host> file list /var/tmp
dcd.core
rpd.core
```

file delete (Routing Matrix)

```
user@host> file list lcc0-re0:/var/tmp
dcd.core
rpd.core
snmpd.core

user@host> file delete lcc0-re0:/var/tmp/snmpd.core
user@host> file list /var/tmp
dcd.core
rpd.core
```

file list

Syntax	file list <detail recursive> <filename>
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 a list of files on the local router or switch.
Options	<p>none—Display a list of all files for the current directory.</p> <p>detail recursive—(Optional) Display detailed output or descend recursively through the directory hierarchy, respectively.</p> <p>filename—(Optional) Display a list of files. For a routing matrix, the filename must include the chassis information.</p>
Additional Information	The default directory is the home directory of the user logged in to the router or switch. To view available directories, enter a space and then a backslash (/) after the file list command. To view files within a specific directory, include a backslash followed by the directory and, optionally, subdirectory name after the file list command.
Required Privilege Level	maintenance
List of Sample Output	file list on page 188 file list (Routing Matrix) on page 188
Output Fields	When you enter this command, you are provided feedback on the status of your request.

Sample Output

file list

```
user@host> file list /var/tmp
dcd.core
rpd.core
snmpd.core
```

file list (Routing Matrix)

```
user@host> file list lcc0-re0:var/tmp
lcc0-re0:
```

```
-----
/var/tmp/:
.gdbinit
.pccardd
Test/
chassisd*
chassisd.nathan*
check_time*
cores/
diagTestPrep*
diagtest*
diagtest.regress*
do_switchovers*
dump_test*
err.manoj.log
esw_clearstats*
esw_counter*
esw_debug*
esw_debug_ge*
esw_filt_test*
esw_filter_tnp_addr*
esw_getstats*
esw_phy*
esw_stats*
```

file rename

Syntax	<code>file rename <i>source destination</i></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	Rename a file on the local router or switch.
Options	<i>destination</i> —New name for the file. <i>source</i> —Original name of the file. For a routing matrix, the filename must include the chassis information.
Required Privilege Level	maintenance
List of Sample Output	file rename on page 190 file rename (Routing Matrix) on page 190
Output Fields	When you enter this command, you are provided feedback on the status of your request.

Sample Output

file rename

The following example lists the files in **/var/tmp**, renames one of the files, and then displays the list of files again to reveal the newly named file.

```
user@host> file list /var/tmp
dcd.core
rpd.core
snmpd.core

user@host> file rename /var/tmp/dcd.core /var/tmp/dcd.core.990413
user@host> file list /var/tmp
dcd.core.990413
rpd.core
snmpd.core
```

file rename (Routing Matrix)

The following example lists the files in **/var/tmp**, renames one of the files, and then displays the list of files again to reveal the newly named file.

```
user@host> file list lcc0-re1:/var/tmp
lcc0-re1:
-----

/var/tmp:
.pccardd
sartre.conf
snmpd
syslogd.core-tarball.0.tgz

user@host> file rename lcc0-re0:/var/tmp/snmpd /var/tmp/snmpd.rr
user@host> file list lcc0-re1:/var/tmp
lcc0-re1:
-----

/var/tmp:
.pccardd
sartre.conf
snmpd.rr
syslogd.core-tarball.0.tgz
```


file show

Syntax	<code>file show <i>filename</i></code> <code><encoding (base64 raw)></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	Display the contents of a file.
Options	<i>filename</i> —Name of a file. For a routing matrix, the filename must include the chassis information. encoding (base64 raw) —(Optional) Encode file contents with base64 encoding or show raw text.
Required Privilege Level	maintenance
List of Sample Output	file show on page 192 file show (Routing Matrix) on page 192
Output Fields	When you enter this command, you are provided feedback on the status of your request.

Sample Output

file show

```
user@host> file show /var/log/messages
Apr 13 21:00:08 romney /kernel: so-1/1/2: loopback suspected; going to standby.
Apr 13 21:00:40 romney /kernel: so-1/1/2: loopback suspected; going to standby.
Apr 13 21:02:48 romney last message repeated 4 times
Apr 13 21:07:04 romney last message repeated 8 times
Apr 13 21:07:13 romney /kernel: so-1/1/0: Clearing SONET alarm(s) RDI-P
Apr 13 21:07:29 romney /kernel: so-1/1/0: Asserting SONET alarm(s) RDI-P
...
```

file show (Routing Matrix)

```
user@host> file show lcc0-re0:/var/tmp/gdbinit
lcc0-re0:
-----
#####
# Settings
#####

set print pretty

#####
# Basic stuff
#####

define msgbuf
    printf "%s", msgbuf->msg_ptr
end
# hex dump of a block of memory
# usage: dump address length
define dump
    p $arg0, $arg1
    set $ch = $arg0
    set $j = 0
    set $n = $arg1
    while ($j < $n)
        #printf "%x %x ",&$ch[$j],$ch[$j]
        printf "%x ",$ch[$j]
        set $j = $j + 1
        if (!($j % 16))
            printf "\n"
        end
    end
end
end
```

CHAPTER 10

System Software Administrative Commands

clear system commit

Syntax	clear system commit
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	Clear any pending commit operation.
Options	This command has no options.
Required Privilege Level	maintenance (or the actual user who scheduled the commit)
Related Documentation	<ul style="list-style-type: none">• show system commit on page 254
List of Sample Output	clear system commit on page 194 clear system commit (None Pending) on page 194 clear system commit (User Does Not Have Required Privilege Level) on page 194
Output Fields	When you enter this command, you are provided feedback on the status of your request.

Sample Output

clear system commit	user@host> clear system commit Pending commit cleared.
clear system commit (None Pending)	user@host> clear system commit No commit scheduled.
clear system commit (User Does Not Have Required Privilege Level)	user@host> clear system commit error: Permission denied

clear system reboot

Syntax	clear system reboot <both-routing-engines>
Syntax (EX Series Switches)	clear system reboot <all-members> <both-routing-engines> <local> <member <i>member-id</i> >
Syntax (TX Matrix Router)	clear system reboot <both-routing-engines> <all-chassis all-lcc lcc <i>number</i> scc>
Syntax (TX Matrix Plus Router)	clear system reboot <both-routing-engines> <all-chassis all-lcc lcc <i>number</i> sfc <i>number</i> >
Syntax (QFX Series)	clear system reboot <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	Clear any pending system software reboots or halts. When issued on a TX Matrix router without any options, the default behavior clears all pending system software reboots or halts on all T640 routers connected to the TX Matrix router. When issued on a TX Matrix Plus router without any options, the default behavior clears all pending system software reboots or halts on all T1600 or T4000 routers connected to the TX Matrix Plus router.
Options	<p>none—Clear all pending system software reboots or halts.</p> <p>all-chassis—(TX Matrix routers and TX Matrix Plus routers only) (Optional) Clear all halt or reboot requests for all the Routing Engines in the chassis.</p> <p>all-lcc—(TX Matrix routers and TX Matrix Plus routers only) (Optional) On a TX Matrix router, clear all halt or reboot requests for all T640 routers (or line-card chassis) connected to the TX Matrix router. On a TX Matrix Plus router, clear all halt or reboot requests on the l connected T1600 or T4000 LCCs.</p> <p>all-members—(EX4200 switches only) (Optional) Clear all halt or reboot requests on all members of the Virtual Chassis configuration.</p> <p>both-routing-engines—(Systems with multiple Routing Engines) (Optional) Clear all halt or reboot requests on both Routing Engines. On a TX Matrix router, clear both Routing Engines on all chassis connected to the TX Matrix router. Likewise, on a TX Matrix</p>

Plus router, clear both Routing Engines on all chassis connected to the TX Matrix Plus router.

infrastructure *name*—(QFabric systems) (Optional) Clear all halt or reboot requests on the fabric control Routing Engines or fabric manager Routing Engines.

interconnect-device *name*—(QFabric systems) (Optional) Clear all halt or reboot requests on the Interconnect device.

lcc *number*—(TX Matrix routers and TX Matrix Plus routers only) (Optional) On a TX Matrix router, clear all halt or reboot requests for a specific T640 router that is connected to the TX Matrix router. On a TX Matrix Plus router, clear all halt or reboot requests for a specific router that is connected to the TX Matrix Plus router.

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

- 0 through 3, when T640 routers are connected to a TX Matrix router in a routing matrix.
- 0 through 3, when T1600 routers are connected to a TX Matrix Plus router in a routing matrix.
- 0 through 7, when T1600 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.
- 0, 2, 4, or 6, when T4000 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.

local—(EX4200 switches only) (Optional) Clear all halt or reboot requests on the local Virtual Chassis member.

member *member-id*—(EX4200 switches only) (Optional) Clear all halt or reboot requests on the specified member of the Virtual Chassis configuration. Replace *member-id* with a value from 0 through 9.

node-group *name*—(QFabric systems) (Optional) Clear all halt or reboot requests on the Node group.

scc—(TX Matrix routers only) (Optional) Clear all halt or reboot requests for the TX Matrix router (or switch-card chassis).

sfc *number*—(TX Matrix Plus routers only) (Optional) Clear all halt or reboot requests for the TX Matrix Plus router. Replace *number* with 0.

Required Privilege Level

maintenance

Related Documentation

- [request system reboot on page 221](#)
- [request system reboot](#)
- [Rebooting and Halting a QFX Series Product](#)
- [Routing Matrix with a TX Matrix Plus Router Solutions Page](#)

List of Sample Output [clear system reboot on page 198](#)
 [clear system reboot \(TX Matrix Router\) on page 198](#)
 [clear system reboot \(QFX Series\) on page 198](#)

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

Sample Output

clear system reboot

```
user@host> clear system reboot
reboot requested by root at Sat Dec 12 19:37:34 1998
[process id 17855]
Terminating...
```

clear system reboot (TX Matrix Router)

```
user@host> clear system reboot
scc-re0:
-----
No shutdown/reboot scheduled.
lcc0-re0:
-----
No shutdown/reboot scheduled.
lcc2-re0:
-----
No shutdown/reboot scheduled.
```

clear system reboot (QFX Series)

```
user@switch> clear system reboot node-group node1
No shutdown/reboot scheduled.
```


configure


Syntax	configure <dynamic> <exclusive> <private>
Release Information	Command introduced before Junos OS Release 7.4. Command introduced in Junos OS Release 9.0 for EX Series switches.
Description	Enter configuration mode. When this command is entered without any optional keywords, everyone can make configuration changes and commit all changes made to the configuration.
Options	<p>none—Enter configuration mode.</p> <p>dynamic—(Optional) Configure routing policies and certain routing policy objects in a dynamic database that is not subject to the same verification required in the standard configuration database. As a result, the time it takes to commit changes to the dynamic database is much shorter than for the standard configuration database. You can then reference these policies and policy objects in routing policies you configure in the standard database.</p> <p>exclusive—(Optional) Lock the candidate configuration for as long as you remain in configuration mode, allowing you to make changes without interference from other users. Other users can enter and exit configuration mode, but they cannot change the configuration.</p> <p>private—(Optional) Allow multiple users to edit different parts of the configuration at the same time and to commit only their own changes, or to roll back without interfering with one another's changes. You cannot commit changes in configure private mode when another user is in configure exclusive mode.</p>
Additional Information	For more information about the different methods of entering configuration mode and the restrictions that apply, see the <i>Junos OS Administration Library for Routing Devices</i> .
Required Privilege Level	configure
Related Documentation	<ul style="list-style-type: none"> • show configuration on page 250
List of Sample Output	configure on page 200
Output Fields	When you enter this command, you are placed in configuration mode and the system prompt changes from <i>hostname></i> to <i>hostname#</i> .

Sample Output

configure

```
user@host> configure
Entering configuration mode
[edit]
user@host#
```

request system configuration rescue delete


Syntax	request system configuration rescue delete
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 an existing rescue configuration.
	<div>  <p>NOTE: The [edit system configuration] hierarchy is not available on QFabric systems.</p> </div>
Options	This command has no options.
Required Privilege Level	maintenance
Related Documentation	<ul style="list-style-type: none"> • request system configuration rescue save on page 202 • request system software rollback • show system commit on page 254
List of Sample Output	request system configuration rescue delete on page 201
Output Fields	This command produces no output.

Sample Output

```
request system
configuration rescue
delete
```

```
user@host> request system configuration rescue delete
```

request system configuration rescue save


Syntax	request system configuration rescue save
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 the most recently committed configuration as the rescue configuration so that you can return to it at any time by using the rollback command.
	<div> NOTE: The [edit system configuration] hierarchy is not available on QFabric systems.</div>
Options	This command has no options.
Required Privilege Level	maintenance
Related Documentation	<ul style="list-style-type: none">• <i>request system software delete</i>• <i>request system software rollback</i>• show system commit on page 254
List of Sample Output	request system configuration rescue save on page 202
Output Fields	This command produces no output.

Sample Output

<code>request system configuration rescue save</code>	<code>user@host> request system configuration rescue save</code>
---	---

request system halt

Syntax	request system halt <at <i>time</i> > <backup-routing-engine> <both-routing-engines> <other-routing-engine> <in <i>minutes</i> > <media (compact-flash disk removable-compact-flash usb)> <message " <i>text</i> ">
Syntax (EX Series Switches)	request system halt <all-members> <at <i>time</i> > <backup-routing-engine> <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> >
Syntax (PTX Series)	request system halt <at <i>time</i> > <backup-routing-engine> <both-routing-engines> <other-routing-engine> <in <i>minutes</i> > <media (compact-flash disk)> <message " <i>text</i> ">
Syntax (TX Matrix Router)	request system halt <all-lcc lcc <i>number</i> scc> <at <i>time</i> > <backup-routing-engine> <both-routing-engines> <other-routing-engine> <in <i>minutes</i> > <media (compact-flash disk)> <message " <i>text</i> ">
Syntax (TX Matrix Plus Router)	request system halt <all-chassis all-lcc lcc <i>number</i> sfc <i>number</i> > <at <i>time</i> > <backup-routing-engine> <both-routing-engines> <other-routing-engine> <in <i>minutes</i> > <media (compact-flash disk)> <message " <i>text</i> ">

Syntax (MX Series Router)	<pre>request system halt <all-members> <at <i>time</i>> <backup-routing-engine> <both-routing-engines> <in <i>minutes</i>> <local> <media (external internal)> <member <i>member-id</i>> <message "<i>text</i>"> <other-routing-engine></pre>
Syntax (QFX Series)	<pre>request system halt <all-members> <at <i>time</i>> <director-device <i>director-device-id</i>> <in <i>minutes</i>> <local> <media > <member <i>member-id</i>> <message "<i>text</i>"> <slice <i>slice</i>></pre>
Release Information	<p>Command introduced before Junos OS Release 7.4.</p> <p>other-routing-engine option introduced in Junos OS Release 8.0.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</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>director-device option introduced for QFabric systems in Junos OS Release 12.2.</p> <p>backup-routing-engine option introduced in Junos OS Release 13.1.</p>
Description	Stop the router or switch software.
	<div>  <p>NOTE: When you issue this command on an individual component in a QFabric system, you will receive a warning that says “Hardware-based members will halt, Virtual Junos Routing Engines will reboot.” If you want to halt only one member of a Node group, use the member option from the Node group CLI. You cannot issue this command from the QFabric CLI.</p> </div>
Options	<p>none—Stop the router or switch software immediately.</p> <p>all-chassis—(TX Matrix routers and TX Matrix Plus routers only) (Optional) Halt all chassis.</p> <p>all-lcc—(TX Matrix routers and TX Matrix Plus routers only) (Optional) On a TX Matrix router, halt all T640 routers (or line-card chassis) connected to the TX Matrix router. On a TX Matrix Plus router, halt all T1600 or T4000 routers connected to the TX Matrix Plus router.</p> <p>all-members—(EX4200 switches and MX Series routers only) (Optional) Halt all members of the Virtual Chassis configuration.</p>

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

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

backup-routing-engine—(Optional) Halt the backup Routing Engine. This command halts the backup Routing Engine, regardless from which Routing Engine the command is executed. For example, if you issue the command from the master Routing Engine, the backup Routing Engine is halted. If you issue the command from the backup Routing Engine, the backup Routing Engine is halted.

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

director-device *director-device-id*—(QFabric systems only) Halt a specific Director device.

lcc *number*—(TX Matrix routers and TX Matrix Plus routers only) (Optional) On a TX Matrix router, halt a specific T640 router that is connected to the TX Matrix router. On a TX Matrix Plus router, halt a specific router that is connected to the TX Matrix Plus router.

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

- 0 through 3, when T640 routers are connected to a TX Matrix router in a routing matrix.
- 0 through 3, when T1600 routers are connected to a TX Matrix Plus router in a routing matrix.
- 0 through 7, when T1600 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.
- 0, 2, 4, or 6, when T4000 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.

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

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

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

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

- **external**—Halt the external mass storage device.

- **internal**—Halt the internal flash device.

member *member-id*—(EX4200 switches and MX Series routers only) (Optional) Halt 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 the software.

other-routing-engine—(Optional) Halt 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 halted. Similarly, if you issue the command from the backup Routing Engine, the master Routing Engine is halted.

scc—(TX Matrix routers only) (Optional) Halt the TX Matrix router (or switch-card chassis).

sfc *number*—(TX Matrix Plus routers only) (Optional) Halt the TX Matrix Plus router (or switch-fabric chassis). Replace *number* with 0.

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

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

Additional Information On the M7i router, the **request system halt** command does not immediately power down the Packet Forwarding Engine. The power-down process can take as long as 5 minutes.

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



NOTE: If you have a router or switch with two Routing Engines and you want to shut the power off to the router or switch or remove a Routing Engine, you must first halt the backup Routing Engine (if it has been upgraded), and then halt the master Routing Engine. To halt a Routing Engine, issue the **request system halt** command. You can also halt both Routing Engines at the same time by issuing the **request system halt both-routing-engines** command.

Required Privilege Level maintenance

Related Documentation

- [clear system reboot on page 195](#)

- [request system power-off on page 217](#)
- *Rebooting and Halting a QFX Series Product*
- *Routing Matrix with a TX Matrix Plus Router Solutions Page*

List of Sample Output [request system halt on page 208](#)
[request system halt \(In 2 Hours\) on page 208](#)
[request system halt \(Immediately\) on page 208](#)
[request system halt \(At 1:20 AM\) on page 208](#)

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

Sample Output

request system halt

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

*** FINAL System shutdown message from root@section2 ***
System going down IMMEDIATELY
Terminated
...
syncing disks... 11 8 done
The operating system has halted.
Please press any key to reboot.
```

request system halt (In 2 Hours)

The following example, which assumes that the time is 5 PM (1700), illustrates three different ways to request that the system stop 2 hours from now:

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

request system halt (Immediately)

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

request system halt (At 1:20 AM)

To stop 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 halt at yymmdd120
request system halt at 120
Halt the system at 120? [yes,no] (no) yes
```

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 209
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

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

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 211
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 logout

Syntax	<code>request system logout (pid <i>pid</i> terminal <i>terminal</i> user <i>username</i>) <all></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	Log out users from the router or switch and the configuration database. If a user held the configure exclusive lock, this command clears the exclusive lock.
Options	all —(Optional) Log out all sessions owned by a particular PID, terminal session, or user. (On a TX Matrix or TX Matrix Plus router, this command is broadcast to all chassis.) pid <i>pid</i> —Log out the user session using the specified management process identifier (PID). The PID type must be management process. terminal <i>terminal</i> —Log out the user for the specified terminal session. user <i>username</i> —Log out the specified user.
Required Privilege Level	configure
Related Documentation	<ul style="list-style-type: none">• <i>Junos OS Administration Library for Routing Devices</i>
List of Sample Output	request system logout on page 212
Output Fields	When you enter this command, you are provided feedback on the status of your request.

Sample Output

`request system logout` `user@host> request system logout user tammy all`
Connection closed by foreign host.

request system partition abort

Syntax	request system partition abort
Syntax (TX Matrix Router)	request system partition abort <all-chassis all-lcc lcc <i>number</i> scc>
Syntax (TX Matrix Plus Router)	request system partition abort <all-chassis all-lcc lcc <i>number</i> sfc <i>number</i> >
Syntax (MX Series Router)	request system partition abort <all-members> <local> <member <i>member-id</i> >
Release Information	Command introduced before Junos OS Release 7.4. sfc option introduced for the TX Matrix Plus router in Junos OS Release 9.6.
Description	Terminate a previously scheduled storage media partition operation. If the command is issued between the time of a partition request and a reboot, the partition request is aborted and the storage media is not affected.
Options	<p>all-chassis—(TX Matrix and TX Matrix Plus routers only) (Optional) Abort a previously scheduled partition operation for all chassis.</p> <p>all-lcc—(TX Matrix and TX Matrix Plus routers only) (Optional) On a TX Matrix router, abort a previously scheduled partition operation on all T640 routers (line-card chassis) connected to the TX Matrix router. On a TX Matrix Plus router, abort a previously scheduled partition operation on all routers (line-card chassis) connected to the TX Matrix Plus router.</p> <p>all-members—(MX Series routers only) (Optional) Abort a previously scheduled partition operation for all members of the Virtual Chassis configuration.</p> <p>lcc <i>number</i>—(TX Matrix and TX Matrix Plus routers only) (Optional) On a TX Matrix Plus router, abort a previously scheduled partition operation on a specific T640 router that is connected to the TX Matrix router. On a TX Matrix Plus router, abort a previously scheduled partition operation on a specific router that is connected to the TX Matrix Plus router.</p> <p>Replace <i>number</i> with the following values depending on the LCC configuration:</p> <ul style="list-style-type: none"> • 0 through 3, when T640 routers are connected to a TX Matrix router in a routing matrix. • 0 through 3, when T1600 routers are connected to a TX Matrix Plus router in a routing matrix. • 0 through 7, when T1600 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix. • 0, 2, 4, or 6, when T4000 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.

local—(MX Series routers only) (Optional) Abort a previously scheduled partition operation for the local Virtual Chassis member.

member *member-id*—(MX Series routers only) (Optional) Abort a previously scheduled partition operation for the specified member of the Virtual Chassis configuration. Replace *member-id* with a value of 0 or 1.

scc—(TX Matrix routers only) (Optional) Abort a previously scheduled partition operation on the TX Matrix router (or switch-card chassis).

sfc *number*—(TX Matrix Plus routers only) (Optional) Abort a previously scheduled partition operation on the TX Matrix Plus router (or switch-fabric chassis). Replace *number* with 0.

Required Privilege Level maintenance

Related Documentation • [request system partition hard-disk on page 215](#)

List of Sample Output [request system partition abort on page 214](#)

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

Sample Output

**request system
partition abort**

```
user@host> request system partition abort
The hard disk is no longer scheduled to be partitioned.
```


request system partition hard-disk

Syntax	request system partition hard-disk
Syntax (TX Matrix Router)	request system partition hard-disk <all-chassis all-lcc lcc <i>number</i> scc>
Syntax (TX Matrix Plus Router)	request system partition hard-disk <all-chassis all-lcc lcc <i>number</i> sfc <i>number</i> >
Syntax (MX Series Router)	request system partition hard-disk <all-members> <local> <member <i>member-id</i> >
Release Information	Command introduced before Junos OS Release 7.4. sfc option introduced for the TX Matrix Plus router in Junos OS Release 9.6.
Description	Set up the hard disk for partitioning. After this command is issued, the hard disk is partitioned the next time the system is rebooted. When the hard disk is partitioned, the contents of /altroot and /altconfig are saved and restored. All other data on the hard disk is at risk of being lost.
Options	<p>all-chassis—(TX Matrix routers and TX Matrix Plus routers only) (Optional) Schedule a partition of the hard disk for all routers in the chassis at its next reboot.</p> <p>all-lcc—(TX Matrix and TX Matrix Plus routers only) (Optional) On a TX Matrix router, schedule a partition of the hard disk on all T640 routers connected to the TX Matrix router at their next reboot. On a TX Matrix Plus router, schedule a partition of the hard disk on all connected LCCs.</p> <p>all-members—(MX Series routers only) (Optional) Schedule a partition of the hard disk for all members of the Virtual Chassis configuration.</p> <p>lcc <i>number</i>—(TX Matrix routers and TX Matrix Plus routers only) (Optional) On a TX Matrix Plus router, schedule a partition of the hard disk on a specific T640 router connected to the TX Matrix router. On a TX Matrix Plus router, schedule a partition of the hard disk on a specific router that is connected to the TX Matrix Plus router. Replace <i>number</i> with the following values depending on the LCC configuration:</p> <ul style="list-style-type: none"> • 0 through 3, when T640 routers are connected to a TX Matrix router in a routing matrix. • 0 through 3, when T1600 routers are connected to a TX Matrix Plus router in a routing matrix. • 0 through 7, when T1600 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix. • 0, 2, 4, or 6, when T4000 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.

local—(MX Series routers only) (Optional) Schedule a partition of the hard disk for the local member of the Virtual Chassis.

member *member-id*—(MX Series routers only) (Optional) Schedule a partition of the hard disk for the specified member of the Virtual Chassis configuration. Replace ***member-id*** with a value of 0 or 1.

scc—(TX Matrix routers only) (Optional) Schedule a partition of the hard disk on the T640 router connected to the TX Matrix router (or switch-card chassis).

sfc *number*—(TX Matrix Plus routers only) (Optional) Schedule a partition of the hard disk on the connected T1600 or T4000 LCCs connected to the TX Matrix Plus router. Replace ***number*** with 0.

Additional Information To immediately partition the hard disk, use the **request system reboot** command. To cancel the partition request, use the **request system partition abort** command.

Required Privilege Level maintenance

Related Documentation

- [request system partition abort on page 213](#)
- [Routing Matrix with a TX Matrix Plus Router Solutions Page](#)

List of Sample Output [request system partition hard-disk on page 216](#)

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

Sample Output

**request system
partition hard-disk**

```
user@host> request system partition hard-disk
WARNING: The hard disk is about to be partitioned. The contents
WARNING: of /altroot and /altconfig will be saved and restored.
WARNING: All other data is at risk. This is the setup stage, the
WARNING: partition happens during the next reboot.

Setting up to partition the hard disk ...

WARNING: A REBOOT IS REQUIRED TO PARTITION THE HARD DISK. Use the
WARNING: 'request system reboot' command when you are ready to proceed
WARNING: with the partitioning. To abort the partition of the hard disk
WARNING: use the 'request system partition abort' command.
```

request system power-off

Syntax	request system power-off <both-routing-engines> <other-routing-engine> <at <i>time</i> > <in <i>minutes</i> > <media (compact-flash disk removable-compact-flash usb)> <message " <i>text</i> ">
Syntax (EX Series Switches)	request system power-off <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> >
Syntax (TX Matrix Router)	request system power-off <all-chassis all-lcc lcc <i>number</i> scc> <both-routing-engines> <other-routing-engine> <at <i>time</i> > <in <i>minutes</i> > <media (compact-flash disk)> <message " <i>text</i> ">
Syntax (TX Matrix Plus Router)	request system power-off <all-chassis all-lcc lcc <i>number</i> sfc <i>number</i> > <both-routing-engines> <other-routing-engine> <at <i>time</i> > <in <i>minutes</i> > <media (compact-flash disk)> <message " <i>text</i> ">
Syntax (MX Series Router)	request system power-off <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>
Syntax (QFX Series)	request system power-off <at <i>time</i> >

```
<in minutes>  
<media (external | internal)>  
<message "text">  
<slice slice>
```

Release Information Command introduced in Junos OS Release 8.0.
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 Power off the software.



NOTE: When you issue this command on an individual component in a QFabric system, you will receive a warning that says “Hardware-based members will halt, Virtual Junos Routing Engines will reboot.” If you want to halt only one member, use the **member** option. You cannot issue this command from the QFabric CLI.

Options **none**—Power off the router or switch software immediately.

all-chassis—(Optional) (TX Matrix and TX Matrix Plus router only) Power off all Routing Engines in the chassis.

all-lcc—(Optional) (TX Matrix and TX Matrix Plus router only) On a TX Matrix router, power off all T640 routers (or line-card chassis) connected to the TX Matrix router. On a TX Matrix Plus router, power off all T1600 routers (or line-card chassis) connected to the TX Matrix Plus router.

all-members—(EX4200 switches and MX Series routers only) (Optional) Power off all members of the Virtual Chassis configuration.

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

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

both-routing-engines—(Optional) Power off both Routing Engines at the same time.

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

lcc number—(Optional) (TX Matrix and TX Matrix Plus router only) On a TX Matrix router, power off a T640 router that is connected to the TX Matrix router. On a TX Matrix Plus router, power off a specific router that is connected to the TX Matrix Plus router.

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

- 0 through 3, when T640 routers are connected to a TX Matrix router in a routing matrix.
- 0 through 3, when T1600 routers are connected to a TX Matrix Plus router in a routing matrix.
- 0 through 7, when T1600 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.
- 0, 2, 4, or 6, when T4000 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.

local—(EX4200 switches and MX Series routers only) (Optional) Power off the local Virtual Chassis member.

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

media (external | internal)—(EX Series and QFX Series switches and MX Series routers only) (Optional) Power off the boot media:

- **external**—Power off the external mass storage device.
- **internal**—Power off the internal flash device.

member *member-id*—(EX4200 switches and MX Series routers only) (Optional) Power off 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 powering off the software.

other-routing-engine—(Optional) Power off 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 halted. Similarly, if you issue the command from the backup Routing Engine, the master Routing Engine is halted.

scc—(Optional) (TX Matrix router only) Power off only the master Routing Engine or the backup Routing Engine on the TX Matrix router (or switch-card chassis). If you issue the command from the master Routing Engine, the master SCC is powered off. If you issue the command from the backup Routing Engine, the backup SCC is powered off.

sfc *number*—(Optional) (TX Matrix Plus router only) Power off only the master Routing Engine or the backup Routing Engine on the TX Matrix Plus router (or switch-fabric chassis). If you issue the command from the master Routing Engine, the master SFC is powered off. If you issue the command from the backup Routing Engine, the backup SFC is powered off. Replace *number* with zero.

slice slice—(EX Series and QFX Series switches only) (Optional) Power off 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 On a routing matrix composed of a TX Matrix router and T640 routers, if you issue the **request system power-off** command on the TX Matrix master Routing Engine, all the master Routing Engines connected to the routing matrix are powered off. If you issue this command on the backup Routing Engine, all the backup Routing Engines connected to the routing matrix are powered off.

Likewise, on a routing matrix composed of a TX Matrix Plus router and T1600 routers, if you issue the **request system power-off** command on the TX Matrix Plus master Routing Engine, all the master Routing Engines connected to the routing matrix are powered off. If you issue this command on the backup Routing Engine, all the backup Routing Engines connected to the routing matrix are powered off.

If you issue the **request system power-off both-routing-engines** command on the TX Matrix or TX Matrix Plus router, all the Routing Engines on the routing matrix are powered off.

Required Privilege Level maintenance

List of Sample Output [request system power-off on page 220](#)

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

Sample Output

request system power-off

```
user@host> request system power-off message "This router will be powered off in 30 minutes.
Please save your data and log out immediately."
warning: This command will not halt the other routing-engine.
If planning to switch off power, use the both-routing-engines option.
Power Off the system ? [yes,no] (no) yes
```

```
*** FINAL System shutdown message from remote@nutmeg ***
System going down IMMEDIATELY
```

```
This router will be powered off in 30 minutes. Please save your data and log out
immediately.
```

```
Shutdown NOW!
[pid 5177]
```

request system reboot

Syntax	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>
Syntax (EX Series Switches)	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> >
Syntax (TX Matrix Router)	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>
Syntax (TX Matrix Plus Router)	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)>
Syntax (MX Series Router)	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>
Release Information	Command introduced before Junos OS Release 7.4.

Option **other-routing-engine** introduced in Junos OS Release 8.0.

Command introduced in Junos OS Release 9.0 for EX Series switches.

Option **sfc** introduced for the TX Matrix Plus router in Junos OS Release 9.6.

Option **both-routing-engines** introduced in Junos OS Release 12.1.

Description Reboot the software.

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

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

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

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

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

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

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

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

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

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

- 0 through 3, when T640 routers are connected to a TX Matrix router in a routing matrix.
- 0 through 3, when T1600 routers are connected to a TX Matrix Plus router in a routing matrix.
- 0 through 7, when T1600 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.
- 0, 2, 4, or 6, when T4000 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.

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

media (compact-flash | disk | 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**
- [clear system reboot on page 195](#)
 - [request system halt on page 203](#)
 - *request system reboot*
 - *Rebooting and Halting a QFX Series Product*
 - [Routing Matrix with a TX Matrix Plus Router Solutions Page](#)

List of Sample Output [request system reboot on page 225](#)
[request system reboot \(at 2300\) on page 225](#)
[request system reboot \(in 2 Hours\) on page 225](#)
[request system reboot \(Immediately\) on page 225](#)
[request system reboot \(at 1:20 AM\) on page 225](#)

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

	Syntax	request system snapshot <partition>
	Syntax (ACX Series Routers)	request system snapshot <media type> <partition>
	Syntax (EX Series Switches)	request system snapshot <all-members local member <i>member-id</i> > <media type> <partition> <re0 re1 routing-engine <i>routing-engine-id</i> > <slice alternate>
	Syntax (J Series Routers)	request system snapshot <as-primary> <config-size <i>size</i> > <data-size <i>size</i> > <factory> <media type> <partition> <root-size <i>size</i> > <swap-size <i>size</i> >
	Syntax (MX Series Routers)	request system snapshot <all-members> <config-partition> <local> <member <i>member-id</i> > <media <i>usb-port-number</i> > <partition> <root-partition>
	Syntax (TX Matrix Routers)	request system snapshot <all-chassis all-lcc lcc <i>number</i> scc> <config-partition> <partition> <root-partition>
	Syntax (TX Matrix Plus Routers)	request system snapshot <all-chassis all-lcc lcc <i>number</i> sfc <i>number</i> > <config-partition> <partition> <root-partition>
	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 <config-partition> and <root-partition> introduced in Junos OS Release 13.1 for M, MX, T, TX Series switches.

Option `<media usb-port-number>` 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*.

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.

as-primary—(J Series routers only) (Optional) Create a snapshot that can be used to replace the medium in the primary compact flash drive. This option can be used on the removable compact flash only. The option copies the default files that were loaded on the primary compact flash drive when it was shipped from the factory, plus the rescue configuration if one has been set. This option is useful if you have multiple routers and want to use the same software and configuration on each router. After a boot device is created as a primary compact flash drive, it can operate in only a primary compact flash drive slot. This option causes the boot medium to be partitioned.

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.

config-size *size*—(J Series routers only) (Optional) Specify the size of the config partition, in megabytes. The default value is 10 percent of physical memory on the boot partition. The config partition is mounted on **/config**, and the configuration files are stored in this partition. This option causes the boot medium to be partitioned.

data-size *size*—(J Series routers only) (Optional) Specify the size of the data partition, in megabytes. The default value is 0 MB. The data partition is mounted on **/data**. This

space is not used by the router, and can be used for extra storage. This option causes the boot medium to be partitioned.

factory—(J Series routers only) (Optional) Copy only default files that were loaded on the primary compact flash drive when it was shipped from the factory, plus the rescue configuration if one has been set. After the boot medium is created with the factory option, it can operate in only the primary compact flash drive.

media type—(J Series 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**—(Switches only) Copy software to an internal flash drive.
- **removable-compact-flash**—Copy software to the removable compact flash drive.
- **usb**—(ACX Series, M320, T640, MX960, and J Series routers only) Copy software to the device connected to the USB port.
- **usb0**—(MX104 routers only) Copy software to the device connected to the USB0 port.
- **usb1**—(MX104 routers only) Copy software to the device connected to the USB1 port.

partition—(Optional) Repartition the flash drive before a snapshot occurs. If the partition table on the flash drive is corrupted, the **request system snapshot** command fails and reports errors. The partition option is only supported for restoring the software image from the hard drive to the flash drive.

(Routers only) You cannot issue the request system snapshot command when you enable flash disk mirroring. We recommend that you disable flash disk mirroring when you upgrade or downgrade the software. For more information, see the *Junos OS Administration Library for Routing Devices*.

(EX Series switches only) If the snapshot destination is the media that the switch did not boot from, you must use the **partition** option.

re0 | re1 | routing-engine routing-engine-id—(EX6200 and EX8200 switches only) Specify where to place the snapshot in a redundant Routing Engine configuration.

- **re0**—Create a snapshot on Routing Engine 0.
- **re1**—Create a snapshot on Routing Engine 1.
- **routing-engine routing-engine-id**—Create a snapshot on the specified Routing Engine.

root-partition—(M, MX, T, TX Series routers only) Create a snapshot of the root partition only and store it onto the default **/altroot** on the hard disk device or an **/altroot** on a USB device.

root-size size—(J Series routers only) (Optional) Specify the size of the root partition, in megabytes. The default value is one-third of the physical memory minus the config, data, and swap partitions. The root partition is mounted on / and does not include configuration files. This option causes the boot medium to be partitioned.

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.

swap-size size—(J Series router only) (Optional) Specify the size of the swap partition, in megabytes. The default value is one-third of the physical memory on a boot medium larger than 128 MB, or 0 MB on a smaller boot device. The swap partition is used for swap files and software failure memory snapshots. Software failure memory snapshots are saved to the boot medium only if it is specified as the dump device in the system dump-device configuration hierarchy. This option causes the boot medium to be partitioned.

- Additional Information**
- (Routers only) Before upgrading the software on the router, when you have a known stable system, issue the **request system snapshot** command to back up the software, including the configuration, to the **/altroot** and **/altconfig** file systems. After you have upgraded the software on the router and are satisfied that the new packages are successfully installed and running, issue the **request system snapshot** command again to back up the new software to the **/altroot** and **/altconfig** file systems.
 - (Routers only) You cannot issue the **request system snapshot** command when you enable flash disk mirroring. We recommend that you disable flash disk mirroring when you upgrade or downgrade the software. For more information, see the *Junos OS Administration Library for Routing Devices*
 - (TX Matrix and TX Matrix Plus router only) On a routing matrix, if you issue the **request system snapshot** command on the master Routing Engine, all the master Routing Engines connected to the routing matrix are backed up. If you issue this command on the backup Routing Engine, all the backup Routing Engines connected to the routing matrix are backed up.

Required Privilege Level maintenance

Related Documentation

- [show system snapshot on page 298](#)
- [show system auto-snapshot](#)

List of Sample Output

- [request system snapshot \(Routers\) on page 231](#)
- [request system snapshot \(EX Series Switches\) on page 231](#)
- [request system snapshot \(When the Partition Flag Is On\) on page 231](#)
- [request system snapshot \(MX104 routers when media device is missing\) on page 231](#)

[request system snapshot \(When Mirroring Is Enabled\) on page 232](#)
[request system snapshot all-lcc \(Routing Matrix\) on page 232](#)
[request system snapshot all-members \(Virtual Chassis\) on page 232](#)

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)

```
user@host > request system snapshot media usb0
error: usb0 media missing or invalid
```

**routers when media
device is missing)****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

Syntax request system software add *package-name*
 <best-effort-load>
 <delay-restart>
 <force>
 <no-copy>
 <no-validate>
 <re0 | re1>
 <reboot>
 <set [*package-name package-name*]>
 <unlink>
 <upgrade-with-config>
 <upgrade-with-config-format *format*>
 <validate>

Syntax (EX Series Switches) request system software add *package-name*
 <best-effort-load>
 <delay-restart>
 <force>
 <no-copy>
 <no-validate>
 <re0 | re1>
 <reboot>
 <set [*package-name package-name*]>
 <upgrade-with-config>
 <upgrade-with-config-format *format*>
 <validate>

Syntax (TX Matrix Router) request system software add *package-name*
 <best-effort-load>
 <delay-restart>
 <force>
 <lcc *number* | scc>
 <no-copy>
 <no-validate>
 <re0 | re1>
 <reboot>
 <set [*package-name package-name*]>
 <unlink>
 <upgrade-with-config>
 <upgrade-with-config-format *format*>
 <validate>

Syntax (TX Matrix Plus Router) request system software add *package-name*
 <best-effort-load>
 <delay-restart>
 <force>
 <lcc *number* | sfc *number*>
 <no-copy>
 <no-validate>
 <re0 | re1>
 <reboot>
 <set [*package-name package-name*]>

	<pre><unlink> <upgrade-with-config> <upgrade-with-config-format <i>format</i>> <validate></pre>
Syntax (MX Series Router)	<pre>request system software add <i>package-name</i> <best-effort-load> <delay-restart> <force> <member <i>member-id</i>> <no-copy> <no-validate> <re0 re1> <reboot> <set [<i>package-name package-name</i>]> <unlink> <upgrade-with-config> <upgrade-with-config-format <i>format</i>> <validate></pre>
Syntax (QFX Series)	<pre>request system software add <i>package-name</i> <best-effort-load> <component all> <delay-restart> <force> <no-copy> <no-validate> <partition> <reboot> <unlink> <upgrade-with-config> <upgrade-with-config-format <i>format</i>> <validate></pre>
Release Information	<p>Command introduced before Junos OS Release 7.4.</p> <p>best-effort-load and unlink options added in Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</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 11.1 for EX Series switches.</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>



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 routers and TX Matrix Plus routers only) (Optional) In a routing matrix based on the TX Matrix router, install a software package or bundle on a T640 router that is connected to the TX Matrix router. In a routing matrix based on the TX Matrix Plus router, install a software package or bundle on a router that is connected to the TX Matrix Plus router.

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

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

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

member *member-id*—(MX Series routers only) (Optional) Install a software package on the specified Virtual Chassis member. Replace *member-id* with a value of 0 or 1.

partition—(QFX3500 switches only) (Optional) Format and repartition the media before installation.

scc—(TX Matrix routers only) (Optional) Install a software package or bundle on a Routing Engine on a TX Matrix router (or switch-card chassis).

sfc *number*—(TX Matrix Plus routers only) (Optional) Install a software package or bundle on a Routing Engine on a TX Matrix Plus router. Replace *number* with 0.

no-copy—(Optional) Install a software package or bundle, but do not save copies of the package or bundle files.

no-validate—(Optional) When loading a software package or bundle with a different release, suppress the default behavior of the **validate** option.

re0 | re1—(Optional) On routers or switches that support dual or redundant Routing Engines, load a software package or bundle on the Routing Engine in slot 0 (re0) or the Routing Engine in slot 1 (re1).

reboot—(Optional) After adding the software package or bundle, reboot the system. On a QFabric switch, the software installation is not complete until you reboot the component for which you have installed the software.

set [*package-name package-name*]—(Mixed EX4200 and EX4500 Virtual Chassis only) (Optional) Install two software packages—a package for an EX4200 switch and the same release of the package for an EX4500 switch—to upgrade all member switches in a mixed EX4200 and EX4500 Virtual Chassis.

set [*package-name package-name*]—(M Series, MX Series, T Series routers, and Branch SRX Series Services Gateways only) (Optional) Install multiple software packages and software add-on packages at the same time.

unlink—(Optional) On 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` configuration statements 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 configuration statements are validated during the validation process and applied to the router or switch during the upgrade process. If the upgrade process is successful, the statements are removed from the configuration. If the upgrade process fails, the configuration file is renamed with the `.failed` suffix.

validate—(Optional) Validate the software package or bundle against the current configuration as a prerequisite to adding the software package or bundle. This is the default behavior when the software package or bundle being added is a different release.



NOTE: The `validate` option only works on systems that do not have `graceful-switchover` (GRES) enabled. To use the `validate` option on a system with GRES, either disable GRES for the duration of the installation, or install using the command `request system software in-service-upgrade`, which requires nonstop active routing (NSR) to be enabled when using GRES.

Additional Information

Before upgrading the software on the router or switch, when you have a known stable system, issue the **`request system snapshot`** command to back up the software, including the configuration, to the `/altroot` and `/altconfig` file systems. After you have upgraded the software on the router or switch and are satisfied that the new package or bundle is successfully installed and running, issue the **`request system snapshot`** command again to back up the new software to the `/altroot` and `/altconfig` file systems.



NOTE: The `request system snapshot` command is currently not supported on the QFabric system. Also, you cannot add or install multiple packages on a QFabric system.

After you run the **`request system snapshot`** command, you cannot return to the previous version of the software, because the running and backup copies of the software are identical.

If you are upgrading more than one package at the same time, delete the operating system package, `jkernel`, last. Add the operating system package, `jkernel`, 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/jkernel
user@host> request system software add /var/tmp/jpfe
user@host> request system software add /var/tmp/jdocs
user@host> request system software add /var/tmp/jroute
user@host> request system software add /var/tmp/jcrypto

```

By default, when you issue the **request system software add *package-name*** command on a TX Matrix master Routing Engine, all the T640 master Routing Engines that are connected to it are upgraded to the same version of software. If you issue the same command on the TX Matrix backup Routing Engine, all the T640 backup Routing Engines that are connected to it are upgraded to the same version of software.

Likewise, when you issue the **request system software add *package-name*** command on a TX Matrix Plus master Routing Engine, all the T1600 or T4000 master Routing Engines that are connected to it are upgraded to the same version of software. If you issue the same command on the TX Matrix Plus backup Routing Engine, all the T1600 or T4000 backup Routing Engines that are connected to it are upgraded to the same version of software.

Required Privilege Level	maintenance
Related Documentation	<ul style="list-style-type: none"> • <i>request system software delete</i> • <i>request system software rollback</i> • <i>request system storage cleanup</i> • <i>Upgrading Software on QFX3500 and QFX3600 Standalone Switches</i> • <i>Upgrading Software on a QFabric System</i> • Routing Matrix with a TX Matrix Plus Router Solutions Page
List of Sample Output	request system software add validate on page 240 request system software add (Mixed EX4200 and EX4500 Virtual Chassis) on page 240 request system software add component all (QFabric Systems) on page 240
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

```
user@switch> request system software add /pbdata/packages/jinstall-qfabric-12.2X50-D1.3.rpm
component all
...
```

component all
(QFabric Systems)

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 226 • <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 244](#)
[request system zeroize media on page 244](#)

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 user@host> request system zeroize media
warning: System will be rebooted and may not boot without configuration
```

media

```

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 `vnlr' 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
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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: H1D0 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
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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)
```


CHAPTER 11

System Software Monitoring Commands

show configuration

Syntax	<code>show configuration</code> <code><statement-path></code>
Release Information	Command introduced before Junos OS Release 7.4. Command introduced in Junos OS Release 9.0 for EX Series switches.
Description	Display the configuration that currently is running on the router or switch, which is the last committed configuration.
Options	<p>none—Display the entire configuration.</p> <p>statement-path—(Optional) Display one of the following hierarchies in a configuration. (Each statement-path option has additional suboptions not described here. See the appropriate configuration guide or EX Series switch documentation for more information.)</p> <ul style="list-style-type: none">• access—Network access configuration.• access-profile—Access profile configuration.• accounting-options—Accounting data configuration.• applications—Applications defined by protocol characteristics.• apply-groups—Groups from which configuration data is inherited.• chassis—Chassis configuration.• chassis network-services—Current running mode.• class-of-service—Class-of-service configuration.• diameter—Diameter base protocol layer configuration.• ethernet-switching-options—(EX Series switch only) Ethernet switching configuration.• event-options—Event processing configuration.• firewall—Firewall configuration.• forwarding-options—Options that control packet sampling.• groups—Configuration groups.• interfaces—Interface configuration.• jsrc—JSRC partition configuration.• jsrc-partition—JSRC partition configuration.• logical-systems—Logical system configuration.• poe—(EX Series switch only) Power over Ethernet configuration.• policy-options—Routing policy option configuration.• protocols—Routing protocol configuration.

- **routing-instances**—Routing instance configuration.
- **routing-options**—Protocol-independent routing option configuration.
- **security**—Security configuration.
- **services**—Service PIC applications configuration.
- **snmp**—Simple Network Management Protocol configuration.
- **system**—System parameters configuration.
- **virtual-chassis**—(EX Series switch only) Virtual Chassis configuration.
- **vlan**—(EX Series switch only) VLAN configuration.

Additional Information The portions of the configuration that you can view depend on the user class that you belong to and the corresponding permissions. If you do not have permission to view a portion of the configuration, the text **ACCESS-DENIED** is substituted for that portion of the configuration. If you do not have permission to view authentication keys and passwords in the configuration, because the secret permission bit is not set for your user account, the text **SECRET-DATA** is substituted for that portion of the configuration. If an identifier in the configuration contains a space, the identifier is displayed in quotation marks.

Likewise, when you issue the **show configuration** command with the **| display set** pipe option to view the configuration as **set** commands, those portions of the configuration that you do not have permissions to view are substituted with the text **ACCESS-DENIED**.

Required Privilege Level view

Related Documentation

- *Displaying the Current Junos OS Configuration*
- *Overview of Junos OS CLI Operational Mode Commands*

List of Sample Output [show configuration on page 252](#)
[show configuration policy-options on page 252](#)

Output Fields This command displays information about the current running configuration.

Sample Output

show configuration

```
user@host> show configuration
## Last commit: 2006-10-31 14:13:00 PST by alant version "8.2I0 [builder]"; ##
last changed: 2006-10-31 14:05:53 PST
system {
    host-name nestor;
    domain-name east.net;
    backup-router 192.1.1.254;
    time-zone America/Los_Angeles;
    default-address-selection;
    name-server {
        192.154.169.254;
        192.154.169.249;
        192.154.169.176;
    }
    services {
        telnet;
    }
    tacplus-server {
        1.2.3.4 {
            secret /* SECRET-DATA */;
            ...
        }
    }
}
interfaces {
    ...
}
protocols {
    isis {
        export "direct routes";
    }
}
policy-options {
    policy-statement "direct routes" {
        from protocol direct;
        then accept;
    }
}
```

show configuration policy-options

```
user@host> show configuration policy-options
policy-options {
    policy-statement "direct routes" {
        from protocol direct;
        then accept;
    }
}
```

show host

Syntax	<code>show host <i>hostname</i></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	Display Domain Name System (DNS) hostname information.
Options	<i>hostname</i> —Hostname or address.
Additional Information	The <code>show host</code> command displays the raw data received from the DNS server.
Required Privilege Level	view
List of Sample Output	show host on page 253

Sample Output

```
show host
user@host> show host snark
snark.boojum.net has address 192.168.1.254

user@host> show host 192.168.1.254
Name: snark.boojum.net
Address: 192.168.1.254
Aliases:
```

show system commit

Syntax	show system commit
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 the system commit history and any pending commit operation.
Options	This command has no options.
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> • clear system commit on page 194
List of Sample Output	show system commit on page 255 show system commit (At a Particular Time) on page 255 show system commit (At the Next Reboot) on page 255 show system commit (Rollback Pending) on page 255 show system commit (QFX Series) on page 255
Output Fields	Table 8 on page 254 describes the output fields for the show system commit command. Output fields are listed in the approximate order in which they appear.

Table 8: show system commit Output Fields

Field Name	Field Description
Junos XML protocol	Displays the last 50 commit operations listed, most recent to first. The identifier Junos XML protocol designates a configuration created for recovery using the request system configuration rescue save command.
Junos XML protocol	Date and time of the commit operation.
Junos XML protocol	User who executed the commit operation.
Junos XML protocol	Method used to execute the commit operation: <ul style="list-style-type: none"> • Junos XML protocol—CLI interactive user performed the commit operation. • Junos XML protocol—Junos XML protocol client performed the commit operation. • synchronize—The commit synchronize command was performed on the other Routing Engine. • snmp—An SNMP set request caused the commit operation. • button—A button on the router or switch was pressed to commit a rescue configuration for recovery. • autoinstall—A configuration obtained through autoinstallation was committed. • other—When there is no login name associated with the session, the values for user and client default to root and other. For example, during a reboot after package installation, mgd commits the configuration as a system commit, and there is no login associated with the commit.

Sample Output

show system commit

```
user@host> show system commit
0   2003-07-28 19:14:04 PDT by root via other
1   2003-07-25 22:01:36 PDT by regress via cli
2   2003-07-25 22:01:32 PDT by regress via cli
3   2003-07-25 21:30:13 PDT by root via button
4   2003-07-25 13:46:48 PDT by regress via cli
5   2003-07-25 05:33:21 PDT by root via autoinstall
...
rescue 2002-05-10 15:32:03 PDT by root via other
```

**show system commit
(At a Particular Time)**

```
user@host> show system commit
commit requested by root via cli at Tue May  7 15:59:00 2002
```

**show system commit
(At the Next Reboot)**

```
user@host> show system commit
commit requested by root via cli at reboot
```

**show system commit
(Rollback Pending)**

```
user@host> show system commit
0 2005-01-05 15:00:37 PST by root via cli commit confirmed, rollback in 3mins
```

**show system commit
(QFX Series)**

```
user@switch> show system commit
0 2011-11-25 19:17:49 PST by root via cli
```

show system configuration archival

Syntax show system configuration archival

Release Information Introduced in Junos OS Release 7.6.
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 directory and number of files queued for archival transfer.



.....
NOTE: The [edit system configuration] hierarchy is not available on QFabric systems.
.....

Options This command has no options.

Required Privilege Level maintenance

List of Sample Output [show system configuration archival on page 256](#)

Sample Output

```
show system configuration archival    user@host> show system configuration archival  
                                     /var/transfer/config/:  
total 8
```

show system configuration rescue

Syntax show system configuration rescue

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 a rescue configuration, if one exists.



.....
NOTE: The [edit system configuration] hierarchy is not available on QFabric systems.
.....

Options This command has no options.

Required Privilege Level maintenance

Related Documentation • [show system configuration archival on page 256](#)

List of Sample Output [show system configuration rescue on page 258](#)

Sample Output

**show system
configuration rescue**

```
user@switch> show system configuration rescue
version "7.3"; groups {
  global {
    system {
      host-name router1;
      domain-name customer.net;
      domain-search [ customer.net ];
      backup-router 192.168.124.254;
      name-server {
        172.17.28.11;
        172.17.28.101;
        172.17.28.100;
        172.17.28.10;
      }
      login {
        user regress {
          uid 928;
          class ;
          shell csh;
          authentication {
            encrypted-password "$1$kPU..$w.4FGRAGanJ8U4Yq6sbj7."; ##
SECRET-DATA
          }
        }
      }
      services {
        ftp;
        rlogin;
        rsh;
        telnet;
      }
    }
  }
}
....
```

show system processes

Syntax	<pre>show system processes <brief detail extensive summary> <health (pid <i>process-identifier</i> process-name <i>process-name</i>)> <providers> <resource-limits (brief detail) <i>process-name</i>> <wide></pre>
Syntax (EX Series Switches)	<pre>show system processes <all-members> <brief detail extensive summary> <health (pid <i>process-identifier</i> process-name <i>process-name</i>)> <local> <member <i>member-id</i>> <providers> <resource-limits (brief detail) <i>process-name</i>> <wide></pre>
Syntax (MX Series Routers)	<pre>show system processes <all-members> <brief detail extensive summary> <health (pid <i>process-identifier</i> process-name <i>process-name</i>)> <local> <member <i>member-id</i>> <providers> <resource-limits (brief detail) <i>process-name</i>> <wide></pre>
Syntax (QFX Series)	<pre>show system processes <brief detail extensive summary > <health (pid <i>process-identifier</i> process-name <i>process-name</i>)> <interconnect-device <i>name</i>> <node-group <i>name</i>> <providers> <resource-limits> <wide></pre>
Syntax (TX Matrix Routers)	<pre>show system processes <brief detail extensive summary> <all-chassis all-lcc lcc <i>number</i> scc> <wide></pre>
Syntax (TX Matrix Plus Router)	<pre>show system processes <brief detail extensive summary> <all-chassis all-lcc lcc <i>number</i> sfc <i>number</i>> <wide></pre>
Release Information	<p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Option sfc 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>

Description	Display information about software processes that are running on the router or switch and that have controlling terminals.
Options	<p>none—Display standard information about system processes.</p> <p>brief detail extensive summary—(Optional) Display the specified level of detail.</p> <p>adaptive-services—(Optional) Display the configuration management process that manages the configuration for stateful firewall, Network Address Translation (NAT), intrusion detection services (IDS), and IP Security (IPsec) services on the Adaptive Services PIC.</p> <p>alarm-control—(Optional) Display the process to configure the system alarm.</p> <p>all-chassis—(TX Matrix routers and TX Matrix Plus routers only) (Optional) Display standard system process information about all the T640 routers (in a routing matrix based on the TX Matrix router) or all the T1600 or T4000 routers (in a routing matrix based on the TX Matrix Plus router) in the chassis.</p> <p>all-lcc—(TX Matrix routers and TX Matrix Plus router only) (Optional) Display standard system process information for all T640 routers (or line-card chassis) connected to the TX Matrix router. Display standard system process information for all connected T1600 or T4000 LCCs.</p> <p>all-members—(EX4200 switches and MX Series routers only) (Optional) Display standard system process information for all members of the Virtual Chassis configuration.</p> <p>ancpd-service—Display the Access Node Control Protocol (ANCP) process, which works with a special Internet Group Management Protocol (IGMP) session to collect outgoing interface mapping events in a scalable manner.</p> <p>application-identification—Display the process that identifies an application using intrusion detection and prevention (IDP) to allow or deny traffic based on applications running on standard or nonstandard ports.</p> <p>audit-process—(Optional) Display the RADIUS accounting process.</p> <p>auto-configuration—Display the Interface Auto-Configuration process.</p> <p>bootp—Display the process that enables a router, switch, or interface to act as a Dynamic Host Configuration Protocol (DHCP) or bootstrap protocol (BOOTP) relay agent. DHCP relaying is disabled.</p> <p>captive-portal-content-delivery—Display the HTTP redirect service by specifying the location to which a subscriber's initial Web browser session is redirected, enabling initial provisioning and service selection for the subscriber.</p> <p>ce-l2tp-service—(Optional) (M10, M10i, M7i, and MX Series routers only) Display the Universal Edge Layer 2 Tunneling Protocol (L2TP) process, which establishes L2TP tunnels and Point-to-Point Protocol (PPP) sessions through L2TP tunnels.</p>

cfm—Display Ethernet Operations, Administration, and Maintenance (OAM) connectivity fault management (CFM) process, which can be used to monitor the physical link between two switches.

chassis-control—(Optional) Display the chassis management process.

class-of-service—(Optional) Display the class-of-service (CoS) process, which controls the router's or switch's CoS configuration.

clksyncd-service—Display the external clock synchronization process, which uses synchronous Ethernet (SyncE).

craft-control—Display the process for the I/O of the craft interface.

database-replication—(EX Series switches and MX Series routers only) (Optional) Display the database replication process.

datapath-trace-service—Display the packet path tracing process.

dhcp-service—(EX Series switches and MX Series routers only) (Optional) Display the Dynamic Host Configuration Protocol process, which enables a DHCP server to allocate network IP addresses and deliver configuration settings to client hosts without user intervention.

diameter-service—(Optional) Display the diameter process.

disk-monitoring—(Optional) Display the disk monitoring process, which checks the health of the hard disk drive on the Routing Engine.

dynamic-flow-capture—(Optional) Display the dynamic flow capture (DFC) process, which controls DFC configurations on Monitoring Services III PICs.

ecc-error-logging—(Optional) Display the error checking and correction (ECC) process, which logs ECC parity errors in memory on the Routing Engine.

ethernet-connectivity-fault-management—Display the process that provides IEEE 802.1ag OAM connectivity fault management (CFM) database information for CFM maintenance association end points (MEPs) in a CFM session.

ethernet-link-fault-management—(EX Series switches and MX Series routers only) (Optional) Display the process that provides the OAM link fault management (LFM) information for Ethernet interfaces.

event-processing—(Optional) Display the event process (eventd).

firewall—(Optional) Display the firewall management process, which manages the firewall configuration and enables accepting or rejecting packets that are transiting an interface on a router or switch.

general-authentication-service—(EX Series switches and MX Series routers only) (Optional) Display the general authentication process.

health (*pid* *process-identifier* | *process-name* *process-name*)—(Optional) Display process health information, either by process id (PID) or by process name.

iccp-service—Display the Inter-Chassis Communication Protocol (ICCP) process.

idp-policy—Display the intrusion detection and prevention (IDP) protocol process.

ilmi—Display the Integrated Local Management Interface (ILMI) protocol process, which provides bidirectional exchange of management information between two ATM interfaces across a physical connection.

inet-process—Display the IP multicast family process.

init—Display the process that initializes the USB modem.

interface-control—(Optional) Display the interface process, which controls the router's or switch's physical interface devices and logical interfaces.

kernel-replication—(Optional) Display the kernel replication process, which replicates the state of the backup Routing Engine when graceful Routing Engine switchover (GRES) is configured.

l2-learning—(Optional) Display the Layer 2 address flooding and learning process.

l2cpd-service—Display the Layer 2 Control Protocol process, which enables features such as Layer 2 protocol tunneling and nonstop bridging.

lACP—(Optional) Display the Link Aggregation Control Protocol (LACP) process. LACP provides a standardized means for exchanging information between partner systems on a link to allow their link aggregation control instances to reach agreement on the identity of the LAG to which the link belongs, and then to move the link to that LAG, and to enable the transmission and reception processes for the link to function in an orderly manner.

lcc number—(TX Matrix routers and TX Matrix Plus routers only) (Optional) On a TX Matrix router, display standard system process information for a specific T640 router that is connected to the TX Matrix router. On a TX Matrix Plus router, display standard system process information for a specific router that is connected to the TX Matrix Plus router.

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

- 0 through 3, when T640 routers are connected to a TX Matrix router in a routing matrix.
- 0 through 3, when T1600 routers are connected to a TX Matrix Plus router in a routing matrix.
- 0 through 7, when T1600 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.
- 0, 2, 4, or 6, when T4000 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.

local—(EX4200 switches and MX Series routers only) (Optional) Display standard system process information for the local Virtual Chassis member.

local-policy-decision-function—Display the process for the Local Policy Decision Function, which regulates collection of statistics related to applications and application groups and tracking of information about dynamic subscribers and static interfaces.

logical-system-mux—Display the logical router multiplexer process (lrmuxd), which manages the multiple instances of the routing protocols process (rpd) on a machine running logical routers.

mac-validation—Display the MAC validation process, which configures MAC address validation for subscriber interfaces created on demux interfaces in dynamic profiles on MX Series routers.

member *member-id*—(EX4200 switches and MX Series routers only) (Optional) Display standard system process information for 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.

mib-process—(Optional) Display the MIB II process, which provides the router's MIB II agent.

mobile-ip—(Optional) Display the Mobile IP process, which configures Junos OS Mobile IP features.

mountd-service—(EX Series switches and MX Series routers only) (Optional) Display the service for NFS mounts requests.

mpls-traceroute—(Optional) Display the MPLS Periodic Traceroute process.

mspd—(Optional) Display the Multiservice process.

multicast-snooping—(EX Series switches and MX Series routers only) (Optional) Display the multicast snooping process, which makes Layer 2 devices such as VLAN switches aware of Layer 3 information, such as the media access control (MAC) addresses of members of a multicast group.

named-service—(Optional) Display the DNS Server process, which is used by a router or a switch to resolve hostnames into addresses.

neighbor-liveness—Display the process, which specifies the maximum length of time that the router waits for its neighbor to re-establish an LDP session.

nfsd-service—(Optional) Display the Remote NFS Server process, which provides remote file access for applications that need NFS-based transport.

ntp—Display the Network Time Protocol (NTP) process, which provides the mechanisms to synchronize time and coordinate time distribution in a large, diverse network.

packet-triggered-subscribers—Display the packet-triggered subscribers and policy control (PTSP) process, which allows the application of policies to dynamic subscribers that are controlled by a subscriber termination device.

peer-selection-service—(Optional) Display the Peer Selection Service process.

periodic-packet-services—Display the Periodic packet management process, which is responsible for processing a variety of time-sensitive periodic tasks so that other processes can more optimally direct their resources.

pfe—Display the Packet Forwarding Engine management process.

pgcp-service—(Optional) Display the pgcpd service process running on the Routing Engine.

pgm—Display the Pragmatic General Multicast (PGM) protocol process, which enables a reliable transport layer for multicast applications.

pic-services-logging—(Optional) Display the logging process for some PICs. With this process, also known as fsad (the file system access daemon), PICs send special logging information to the Routing Engine for archiving on the hard disk.

ppp—(Optional) Display the Point-to-Point Protocol (PPP) process, which is the encapsulation protocol process for transporting IP traffic across point-to-point links.

ppp-service—Display the Universal edge PPP process, which is the encapsulation protocol process for transporting IP traffic across universal edge routers.

pppoe—(Optional) Display the Point-to-Point Protocol over Ethernet (PPPoE) process, which combines PPP that typically runs over broadband connections with the Ethernet link-layer protocol that allows users to connect to a network of hosts over a bridge or access concentrator.

process-monitor—Display the process health monitor process (pmond).

providers—(Optional) Display provider processes.

redundancy-interface-process—(Optional) Display the ASP redundancy process.

remote-operations—(Optional) Display the remote operations process, which provides the ping and traceroute MIBs.

resource-cleanup—Display the resource cleanup process.

resource-limits (brief | detail) process-name—(Optional) Display process resource limits.

routing—(Optional) Display the routing protocol process.

sampling—(Optional) Display the sampling process, which performs packet sampling based on particular input interfaces and various fields in the packet header.

sbc-configuration-process—Display the session border controller (SBC) process of the border signaling gateway (BSG).

scc—(TX Matrix routers only) (Optional) Display standard system process information for the TX Matrix router (or switch-card chassis).

sdk-service—Display the SDK Service process, which runs on the Routing Engine and is responsible for communications between the SDK application and Junos OS. Although the SDK Service process is present on the router, it is turned off by default.

secure-neighbor-discovery—(EX Series switches and MX Series routers only) (Optional) Display the secure Neighbor Discovery Protocol (NDP) process, which provides support for protecting NDP messages.

send—(Optional) Display the Secure Neighbor Discovery Protocol (SEND) process, which provides support for protecting Neighbor Discovery Protocol (NDP) messages.

service-deployment—(Optional) Display the service deployment process, which enables Junos OS to work with the Session and Resource Control (SRC) software.

sfc number—(TX Matrix Plus routers only) (Optional) Display system process information for the TX Matrix Plus router. Replace *number* with 0.

snmp—Display the SNMP process, which enables the monitoring of network devices from a central location and provides the router's or switch's SNMP master agent.

sonet-aps—Display the SONET Automatic Protection Switching (APS) process, which monitors any SONET interface that participates in APS.

static-subscribers—(Optional) Display the Static subscribers process, which associates subscribers with statically configured interfaces and provides dynamic service activation and activation for these subscribers.

tunnel-oamd—(Optional) Display the Tunnel OAM process, which enables the Operations, Administration, and Maintenance of Layer 2 tunneled networks. Layer 2 protocol tunneling (L2PT) allows service providers to send Layer 2 protocol data units (PDUs) across the provider's cloud and deliver them to Juniper Networks EX Series Ethernet Switches that are not part of the local broadcast domain.

vrrp—(EX Series switches and MX Series routers only) (Optional) Display the Virtual Router Redundancy Protocol (VRRP) process, which enables hosts on a LAN to make use of redundant routing platforms on that LAN without requiring more than the static configuration of a single default route on the hosts.

watchdog—Display the watchdog timer process, which enables the watchdog timer when Junos OS encounters a problem.

wide—(Optional) Display process information that might be wider than 80 columns.

Additional Information By default, when you issue the **show system processes** command on the master Routing Engine of a TX Matrix router or a TX Matrix Plus router, the command is broadcast to all the master Routing Engines of the LCCs connected to it in the routing matrix. Likewise, if you issue the same command on the backup Routing Engine of a TX Matrix or a TX Matrix Plus router, the command is broadcast to all backup Routing Engines of the LCCs that are connected to it in the routing matrix.

Required Privilege Level view

Related Documentation

- [List of Junos OS Processes on page 14](#)
- [Routing Matrix with a TX Matrix Plus Router Solutions Page](#)

List of Sample Output

- [show system processes on page 269](#)
- [show system processes brief on page 269](#)
- [show system processes detail on page 269](#)
- [show system processes extensive on page 270](#)
- [show system processes lcc wide \(TX Matrix Routing Matrix\) on page 270](#)
- [show system processes summary on page 271](#)
- [show system processes \(TX Matrix Plus Router\) on page 271](#)
- [show system processes sfc \(TX Matrix Plus Router\) on page 279](#)
- [show system processes lcc wide \(TX Matrix Plus Routing Matrix\) on page 281](#)
- [show system processes \(QFX Series\) on page 283](#)

Output Fields [Table 9 on page 266](#) describes the output fields for the **show system processes** command. Output fields are listed in the approximate order in which they appear.

Table 9: show system processes Output Fields

Field Name	Field Description	Level of Output
last pid	Last process identifier assigned to the process.	brief extensive summary
load averages	Three load averages followed by the current time.	brief extensive summary
processes	Number of existing processes and the number of processes in each state (sleeping, running, starting, zombies, and stopped).	brief extensive summary
Mem	Information about physical and virtual memory allocation.	brief extensive summary
Swap	Information about physical and virtual memory allocation.	brief extensive summary
PID	Process identifier.	detail extensive summary
TT	Control terminal name.	none detail

Table 9: show system processes Output Fields (*continued*)

Field Name	Field Description	Level of Output
STAT	<p>Symbolic process state. The state is given by a sequence of letters. The first letter indicates the run state of the process:</p> <ul style="list-style-type: none"> • D—In disk or other short-term, uninterruptible wait • I—Idle (sleeping longer than about 20 seconds) • R—Runnable • S—Sleeping for less than 20 seconds • T—Stopped • Z—Dead (zombie) • + —The process is in the foreground process group of its control terminal. • <—The process has raised CPU scheduling priority. • >—The process has specified a soft limit on memory requirements and is currently exceeding that limit; such a process is not swapped. • A—The process requested random page replacement. • E—The process is trying to exit. • L—The process has pages locked in core. • N—The process has reduced CPU scheduling priority. • S—The process requested first-in, first-out (FIFO) page replacement. • s—The process is a session leader. • V—The process is temporarily suspended. • W—The process is swapped out. • X—The process is being traced or debugged. 	none detail
UID	User identifier.	detail
USERNAME	Process owner.	extensive summary
PPID	Parent process identifier.	detail
CPU	<p>(D)—Short-term CPU usage.</p> <p>(E and S)—Raw (unweighted) CPU usage. The value of this field is used to sort the processes in the output.</p>	detail extensive summary
RSS	Resident set size.	detail
WCHAN	Symbolic name of the wait channel.	detail
STARTED	Local time when the process started running.	detail
PRI	Current priority of the process. A lower number indicates a higher priority.	detail extensive summary
NI or NICE	UNIX "niceness" value. A lower number indicates a higher priority.	detail extensive summary
SIZE	Total size of the process (text, data, and stack), in kilobytes.	extensive summary

Table 9: show system processes Output Fields (*continued*)

Field Name	Field Description	Level of Output
RES	Current amount of resident memory, in kilobytes.	extensive summary
STATE	Current state of the process (for example, sleep , wait , run , idle , zombie , or stop).	extensive summary
TIME	(S)—Number of system and user CPU seconds that the process has used. (None, D, and E)—Total amount of time that the command has been running.	detail extensive summary
WCPU	Weighted CPU usage.	extensive summary
COMMAND	Command that is currently running.	detail extensive summary
THR	Number of threads in the process	extensive

Sample Output

show system processes

```
user@host> show system processes
PID  TT  STAT      TIME COMMAND
  0  ??  DLs       0:00.70 (swapper)
  1  ??  Is        0:00.35 /sbin/init --
  2  ??  DL        0:00.00 (pagedaemon)
  3  ??  DL        0:00.00 (vmdaemon)
  4  ??  DL        0:42.37 (update)
  5  ??  DL        0:00.00 (if_jnx)
 80  ??  Ss        0:14.66 syslogd -s
 96  ??  Is        0:00.01 portmap
128  ??  Is        0:02.70 cron
173  ??  Is        0:02.24 /usr/local/sbin/sshd (sshd1)
189  ??  S         0:03.80 /sbin/watchdog -t180
190  ??  I         0:00.03 /usr/sbin/tetd -N
191  ??  S         2:24.76 /sbin/ibd -N
192  ??  S<        0:55.44 /usr/sbin/xntpd -N
195  ??  S         0:53.11 /usr/sbin/snmpd -N
196  ??  S         1:15.73 /usr/sbin/mib2d -N
198  ??  I         0:00.75 /usr/sbin/inetd -N
2677 ??  I         0:00.01 /usr/sbin/mgd -N
2712 ??  Ss        0:00.24 rlogind
2735 ??  R         0:00.00 /bin/ps -ax
1985 p0-  S        0:07.41 ./rpd -N
2713 p0  Is        0:00.24 -tcsh (tcsh)
2726 p0  S+        0:00.07 cli
```

show system processes brief

```
user@host> show system processes brief
last pid: 543; load averages: 0.00, 0.00, 0.00 18:29:47
37 processes: 1 running, 36 sleeping
```

```
Mem: 25M Active, 3976K Inact, 19M Wired, 8346K Buf, 202M Free
Swap: 528M Total, 64K Used, 528M Free
```

show system processes detail

```
user@host> show system processes detail
PID  UID  PPID CPU PRI NI  RSS WCHAN  STARTED  TT  STAT      TIME COMMAND
3151 1049 3129  2  28  0  672 -        1:13PM  p0  R+       0:00.00 ps -ax -r
   1  0    0  0  10  0  376 wait   1:51PM  ??  Is       0:00.29 /sbin/ini
   2  0    0  0 -18  0  12 psleep  1:51PM  ??  DL       0:00.00 (pagedae
   3  0    0  0  28  0  12 psleep  1:51PM  ??  DL       0:00.00 (vmdaemo
   4  0    0  0  28  0  12 update  1:51PM  ??  DL       0:07.15 (update)
   5  0    0  0  2  0  12 pfesel  1:51PM  ??  IL       0:02.90 (if_pfe)
  27  0    1  0  10  0 17936 mfsidl  1:51PM  ??  Is       0:00.46 mfs /dev/
  81  0    1  0  2  0  496 select  1:52PM  ??  Ss       0:31.21 syslogd -
119  1    1  0  2  0  492 select  1:52PM  ??  Is       0:00.00 portmap
134  0    1  0  2  0  580 select  1:52PM  ??  S        0:02.95 amd -p -a
151  0    1  0  18  0  532 pause  1:52PM  ??  Is       0:00.34 cron
183  0    1  0  2  0  420 select  1:52PM  ??  Ss       0:00.07 /usr/loca
206  0    1  0  18  0  72 pause  1:52PM  ??  S        0:00.51 /sbin/wat
207  0    1  0  2  0  520 select  1:52PM  ??  I        0:00.16 /usr/sbin
208  0    1  0  2  0  536 select  1:52PM  ??  S        0:08.21 /sbin/dcd
210  0    1 255  2 -12  740 select  1:52PM  ??  S<       0:05.83 /usr/sbin
211  0    1  0  2  0  376 select  1:52PM  ??  S        0:00.03 /usr/sbin
215  0    1  0  2  0  548 select  1:52PM  ??  I        0:00.50 /usr/sbin
219  0    1  0  3  0  540 ttyin  1:52PM  v0  Is+      0:00.02 /usr/libe
220  0    1  0  3  0  540 ttyin  1:52PM  v1  Is+      0:00.01 /usr/libe
221  0    1  0  3  0  540 ttyin  1:52PM  v2  Is+      0:00.01 /usr/libe
```

```

222    0    1    0    3    0 540 ttyin  1:52PM v3 Is+  0:00.01 /usr/libe
735    0    1    0    2    0 468 select 2:47PM ?? S    0:19.14 /usr/sbin
736    0    1    0    2    0 212 select 2:47PM ?? S    0:14.13 /usr/sbin
1380   0    1    0    3    0 888 ttyin  7:32PM d0 Is+  0:00.46 bash
3019   0    207   0    2    0 636 select 10:49AM ?? Ss   0:02.93 tnp.chass
3122   0    1380  0    2    0 1764 select 12:33PM d0 S    0:00.77 ./rpd -N
3128   0    215   0    2    0 580 select 12:45PM ?? Ss   0:00.12 rlogind
3129  1049  3128   0    18   0 944 pause 12:45PM p0 Ss   0:00.14 -tcsh (tc
0      0    0    0   -18   0 0 sched  1:51PM ?? DLs  0:00.10 (swapper

```

show system processes extensive

```

user@host> show system processes extensive
Mem: 241M Active, 99M Inact, 78M Wired, 325M Cache, 69M Buf, 1251M Free
Swap: 2048M Total, 2048M Free

```

PID	USERNAME	THR	PRI	NICE	SIZE	RES	STATE	TIME	WCPU	COMMAND
11	root	1	171	52	OK	12K	RUN	807.5H	98.73%	idle
13	root	1	-20	-139	OK	12K	WAIT	36:17	0.00%	swi7: clock sio
1499	root	1	96	0	7212K	3040K	select	34:01	0.00%	license-check
1621	root	1	96	0	20968K	11216K	select	20:25	0.00%	mib2d
1465	root	2	8	-88	115M	11748K	nanslp	14:32	0.00%	chassisd
1478	root	1	96	0	6336K	3816K	select	11:28	0.00%	ppmd
20	root	1	-68	-187	OK	12K	WAIT	10:28	0.00%	irq10: em0 em1+++*
1490	root	1	96	0	11792K	4336K	select	9:44	0.00%	shm-rtsdbd
1618	root	1	96	0	39584K	7464K	select	8:47	0.00%	pfed
1622	root	1	96	0	15268K	10988K	select	6:16	0.00%	snmpd
1466	root	1	96	0	7408K	2896K	select	5:44	0.00%	alarmd
7	root	1	-16	0	OK	12K	client	5:09	0.00%	ifstate notify
1480	root	1	96	0	5388K	2660K	select	4:29	0.00%	ksyncd
12	root	1	-40	-159	OK	12K	WAIT	4:15	0.00%	swi2: netisr 0
1462	root	1	96	0	1836K	1240K	select	3:57	0.00%	bslockd
55	root	1	-16	0	OK	12K	-	3:44	0.00%	schedcpu
1392	root	1	16	0	OK	12K	bcmsem	3:37	0.00%	bcmLINK.0
47	root	1	-16	0	OK	12K	psleep	3:25	0.00%	vmkmemdaemon
36	root	1	20	0	OK	12K	syncer	2:46	0.00%	syncer
1484	root	1	96	0	7484K	3428K	select	2:38	0.00%	clksyncd
1616	root	1	96	0	4848K	2848K	select	2:18	0.00%	irsd
1487	root	1	96	0	32800K	6992K	select	2:10	0.00%	smid
1623	root	1	96	0	34616K	5464K	select	2:01	0.00%	dcd
15	root	1	-16	0	OK	12K	-	1:59	0.00%	yarrow
49	root	1	-16	0	OK	12K	.	1:51	0.00%	ddostasks

show system processes lcc wide (TX Matrix Routing Matrix)

```

user@host> show system processes lcc 2 wide
lcc2-re0:

```

PID	TT	STAT	TIME	COMMAND
0	??	DLs	0:00.00	(swapper)
1	??	ILs	0:00.10	/sbin/preinit -- (init)
2	??	DL	0:00.00	(pagedaemon)
3	??	DL	0:00.00	(vmdaemon)
4	??	DL	0:00.00	(bufdaemon)
5	??	DL	0:00.04	(syncer)
6	??	DL	0:00.00	(netdaemon)
7	??	IL	0:00.00	(if_pic_listen)
8	??	IL	0:00.00	(scs_housekeeping)
9	??	IL	0:00.00	(if_pfe_listen)
10	??	DL	0:00.00	(vmuncachedaemon)
11	??	SL	0:00.02	(cb_poll)
172	??	ILs	0:00.21	mfs -o noauto /dev/ad1s1b /tmp (newfs)


```

2909 ?? Is      0:00.00 pccardd
2932 ?? Ss      0:00.07 syslogd -r -s
3039 ?? Is      0:00.00 cron
3217 ?? I       0:00.00 /sbin/watchdog -d
3218 ?? I       0:00.02 /usr/sbin/tnetd -N
3221 ?? S       0:00.11 /usr/sbin/alarmd -N
3222 ?? S       0:00.85 /usr/sbin/craftd -N
3223 ?? S       0:00.05 /usr/sbin/mgd -N
3224 ?? I       0:00.02 /usr/sbin/inetd -N
3225 ?? I       0:00.00 /usr/sbin/tnp.sntpd -N
3226 ?? I       0:00.01 /usr/sbin/tnp.sntpc -N
3228 ?? I       0:00.01 /usr/sbin/smartd -N
3231 ?? I       0:00.01 /usr/sbin/eccd -N
3425 ?? S       0:00.09 /usr/sbin/dfwd -N
3426 ?? S       0:00.19 /sbin/dcd -N
3427 ?? I       0:00.04 /usr/sbin/pfed -N
3430 ?? S       0:00.10 /usr/sbin/ksyncd -N
3482 ?? S       1:53.63 /usr/sbin/chassisd -N
4285 ?? SL      0:00.01 (peer proxy)
4286 ?? SL      0:00.00 (peer proxy)
4303 ?? Ss      0:00.00 mgd: (mgd) (root) (mgd)
4304 ?? R       0:00.00 /bin/ps -ax -ww
3270 d0 Is+    0:00.00 /usr/libexec/getty std.9600 ttyd0

```

show system processes summary

```

user@host> show system processes summary
last pid: 543; load averages: 0.00, 0.00, 0.00 18:29:47
37 processes: 1 running, 36 sleeping

```

```

Mem: 25M Active, 3976K Inact, 19M Wired, 8346K Buf, 202M Free
Swap: 528M Total, 64K Used, 528M Free

```

PID	USERNAME	PRI	NICE	SIZE	RES	STATE	TIME	WCPU	CPU	COMMAND
527	root	2	0	176K	580K	select	0:00	0.04%	0.04%	rlogind
543	root	30	0	604K	768K	RUN	0:00	0.00%	0.00%	top

show system processes (TX Matrix Plus Router)

```

user@host> show system processes
sfc0-re0:

```

```

-----
PID TT  STAT      TIME COMMAND
 0 ??  Wls      0:00.00 [swapper]
 1 ??  ILs      0:00.18 /packages/mnt/jbase/sbin/init --
 2 ??  DL       0:00.20 [g_event]
 3 ??  DL       0:00.39 [g_up]
 4 ??  DL       0:00.32 [g_down]
 5 ??  DL       0:00.00 [thread taskq]
 6 ??  DL       0:00.09 [kqueue taskq]
 7 ??  DL       0:00.01 [pagedaemon]
 8 ??  DL       0:00.00 [vmdaemon]
 9 ??  DL       0:06.63 [pagezero]
10 ??  DL       0:00.00 [ktrace]
11 ??  RL      310:52.98 [idle]
12 ??  WL       0:11.03 [swi2: net]
13 ??  WL       0:27.58 [swi7: clock sio]
14 ??  WL       0:00.00 [swi6: vm]
15 ??  DL       0:03.02 [yarrow]
16 ??  WL       0:00.00 [swi9: +]
17 ??  WL       0:00.00 [swi8: +]
18 ??  WL       0:00.00 [swi5: cambio]
19 ??  WL       0:00.00 [swi9: task queue]
20 ??  WL       0:11.41 [irq16: uhci0 uhci*]

```

```

21 ?? DL 0:00.00 [usb0]
22 ?? DL 0:00.00 [usbtask]
23 ?? WL 0:39.51 [irq17: uhci1 uhci*]
24 ?? DL 0:00.00 [usb1]
25 ?? WL 0:00.00 [irq18: uhci2 uhci*]
26 ?? DL 0:00.83 [usb2]
27 ?? DL 0:00.00 [usb3]
28 ?? DL 0:00.00 [usb4]
29 ?? DL 0:00.00 [usb5]
30 ?? DL 0:00.73 [usb6]
31 ?? DL 0:00.00 [usb7]
32 ?? WL 0:00.00 [irq14: ata0]
33 ?? WL 0:00.00 [irq15: ata1]
34 ?? WL 0:00.00 [irq1: atkbd0]
35 ?? WL 0:00.00 [swi0: sio]
36 ?? WL 0:00.00 [irq11: isab0]
37 ?? WL 0:00.00 [swi3: ip6opt ipopt]
38 ?? WL 0:00.00 [swi4: ip6mismatch+]
39 ?? WL 0:00.00 [swi1: ipfwd]
40 ?? DL 0:00.02 [bufdaemon]
41 ?? DL 0:00.02 [vnlr]
42 ?? DL 0:00.39 [syncer]
43 ?? DL 0:00.05 [softdepflush]
44 ?? DL 0:00.00 [netdaemon]
45 ?? DL 0:00.02 [vmuncachedaemon]
46 ?? DL 0:00.00 [if_pic_listen]
47 ?? DL 0:00.35 [vmkmemdaemon]
48 ?? DL 0:00.00 [cb_poll]
49 ?? DL 0:00.06 [if_pfe_listen]
50 ?? DL 0:00.00 [scs_housekeeping]
51 ?? IL 0:00.00 [kern_dump_proc]
52 ?? IL 0:00.00 [nfsiod 0]
53 ?? IL 0:00.00 [nfsiod 1]
54 ?? IL 0:00.00 [nfsiod 2]
55 ?? IL 0:00.00 [nfsiod 3]
56 ?? DL 0:00.37 [schedcpu]
57 ?? DL 0:00.56 [md0]
79 ?? DL 0:02.58 [md1]
100 ?? DL 0:00.03 [md2]
118 ?? DL 0:00.01 [md3]
139 ?? DL 0:00.95 [md4]
160 ?? DL 0:00.12 [md5]
181 ?? DL 0:00.00 [md6]
217 ?? DL 0:00.02 [md7]
227 ?? DL 0:00.05 [md8]
1341 ?? SL 0:01.34 [bcmTX]
1342 ?? SL 0:01.68 [bcmXGS3AsyncTX]
1343 ?? SL 0:41.40 [bcmLINK.0]
1345 ?? SL 0:33.83 [bcmLINK.1]
1350 ?? Is 0:00.01 /usr/sbin/cron
1502 ?? S 0:00.01 /sbin/watchdog -t-1
1503 ?? S 0:00.86 /usr/libexec/bslockd -mp -N
1504 ?? S 0:00.01 /usr/sbin/tnetd -N
1507 ?? S 0:01.32 /usr/sbin/alarmd -N
1508 ?? S 0:14.54 /usr/sbin/craftd -N
1509 ?? S 0:01.19 /usr/sbin/mgd -N
1512 ?? I 0:00.05 /usr/sbin/inetd -N
1513 ?? S 0:00.10 /usr/sbin/tnp.sntpd -N
1517 ?? S 0:00.11 /usr/sbin/smartd -N
1525 ?? S 0:01.10 /usr/sbin/idpd -N
1526 ?? S 0:01.43 /usr/sbin/license-check -U -M -p 10 -i 10

```

```

1527 ?? I      0:00.01 /usr/libexec/getty Pc ttyv0
1616 ?? DL     0:00.30 [peer proxy]
1617 ?? DL     0:00.32 [peer proxy]
1618 ?? DL     0:00.34 [peer proxy]
1619 ?? DL     0:00.30 [peer proxy]
2391 ?? Is     0:00.01 telnetd
7331 ?? Ss     0:00.03 telnetd
9538 ?? DL     0:01.16 [jsr_kkcm]
9613 ?? DL     0:00.18 [peer proxy]
23781 ?? Ss    0:00.01 telnetd
23926 ?? Ss    0:00.01 mgd: (mgd) (regress)/dev/ttyp2 (mgd)
36867 ?? S     0:03.14 /usr/sbin/rpd -N
36874 ?? S     0:00.08 /usr/sbin/lmpd
36876 ?? S     0:00.17 /usr/sbin/lacpd -N
36877 ?? S     0:00.15 /usr/sbin/bfdd -N
36878 ?? S     0:05.05 /usr/sbin/ppmd -N
36907 ?? S     0:25.07 /usr/sbin/chassisd -N
37775 ?? S     0:00.01 /usr/sbin/bdbrepd -N
45727 ?? S     0:00.02 /usr/sbin/xntpd -j -N -g (ntpd)
45729 ?? S     0:00.38 /usr/sbin/l2ald -N
45730 ?? S<    0:00.12 /usr/sbin/apsd -N
45731 ?? SN    0:00.10 /usr/sbin/sampled -N
45732 ?? S     0:00.03 /usr/sbin/ilmid -N
45733 ?? S     0:00.09 /usr/sbin/rmopd -N
45734 ?? S     0:00.30 /usr/sbin/cosd
45735 ?? I     0:00.00 /usr/sbin/rtspd -N
45736 ?? S     0:00.06 /usr/sbin/fsad -N
45737 ?? S     0:00.05 /usr/sbin/rdd -N
45738 ?? S     0:00.10 /usr/sbin/pppd -N
45739 ?? S     0:00.05 /usr/sbin/dfcd -N
45740 ?? S     0:00.07 /usr/sbin/lfmd -N
45741 ?? S     0:00.01 /usr/sbin/mplsoamd -N
45742 ?? I     0:00.01 /usr/sbin/sendd -N
45743 ?? S     0:00.08 /usr/sbin/appidd -N
45744 ?? S     0:00.05 /usr/sbin/mspd -N
45745 ?? S     0:00.25 /usr/sbin/jdiameterd -N
45746 ?? S     0:00.10 /usr/sbin/pfed -N
45747 ?? S     0:00.19 /usr/sbin/lpdfd -N
45748 ?? S     0:00.63 /sbin/dcd -N
45750 ?? S     0:00.45 /usr/sbin/mib2d -N
45751 ?? S     0:00.15 /usr/sbin/dfwd -N
45752 ?? S     0:00.15 /usr/sbin/irsd -N
45764 ?? S     0:20.59 /usr/sbin/snmpd -N
56479 ?? Ss    0:00.00 mgd: (mgd) (root) (mgd)
56480 ?? R     0:00.00 /bin/ps -ax
1142 d0- I     0:00.01 /usr/sbin/usbd -N
1160 d0- S     0:29.17 /usr/sbin/eventd -N -r -s -A
6527 d0 Is+    0:00.00 /usr/libexec/getty std.9600 ttyd0
2392 p1 Is     0:00.00 login [pam] (login)
2393 p1 I      0:00.00 -csh (csh)
2394 p1 I      0:00.00 su -
2395 p1 I+     0:00.01 -su (csh)
23782 p2 Is     0:00.00 login [pam] (login)
23881 p2 I      0:00.00 -csh (csh)
23925 p2 S+    0:00.03 cli
7332 p3 Is     0:00.00 login [pam] (login)
7333 p3 I      0:00.00 -csh (csh)
23780 p3 S+    0:00.02 telnet aj

```

```
lcc0-re0:
```

PID	TT	STAT	TIME	COMMAND
0	??	Wls	0:00.00	[swapper]
1	??	ILs	0:00.16	/packages/mnt/jbase/sbin/init --
2	??	DL	0:00.01	[g_event]
3	??	DL	0:00.16	[g_up]
4	??	DL	0:00.11	[g_down]
5	??	DL	0:00.00	[thread taskq]
6	??	DL	0:00.00	[kqueue taskq]
7	??	DL	0:00.00	[pagedaemon]
8	??	DL	0:00.00	[vmdaemon]
9	??	DL	0:01.77	[pagezero]
10	??	DL	0:00.00	[ktrace]
11	??	RL	17:22.31	[idle]
12	??	WL	0:00.32	[swi2: net]
13	??	WL	0:01.21	[swi7: clock sio]
14	??	WL	0:00.00	[swi6: vm]
15	??	DL	0:00.10	[yarrow]
16	??	WL	0:00.00	[swi9: +]
17	??	WL	0:00.00	[swi8: +]
18	??	WL	0:00.00	[swi5: cambio]
19	??	WL	0:00.00	[swi9: task queue]
20	??	WL	0:02.73	[irq10: bcm0 uhci1*]
21	??	WL	0:00.02	[irq11: cb0 uhci0+*]
22	??	DL	0:00.00	[usb0]
23	??	DL	0:00.00	[usbtask]
24	??	DL	0:00.00	[usb1]
25	??	DL	0:00.05	[usb2]
26	??	DL	0:00.00	[usb3]
27	??	DL	0:00.00	[usb4]
28	??	DL	0:00.00	[usb5]
29	??	DL	0:00.04	[usb6]
30	??	DL	0:00.00	[usb7]
31	??	WL	0:00.00	[irq14: ata0]
32	??	WL	0:00.00	[irq15: ata1]
33	??	WL	0:00.00	[irq1: atkbd0]
34	??	WL	0:00.00	[swi0: sio]
35	??	WL	0:00.00	[swi3: ip6opt ipopt]
36	??	WL	0:00.00	[swi4: ip6mismatch+]
37	??	WL	0:00.00	[swi1: ipfwd]
38	??	DL	0:00.00	[bufdaemon]
39	??	DL	0:00.00	[vn1ru]
40	??	DL	0:00.01	[syncer]
41	??	DL	0:00.00	[softdepflush]
42	??	DL	0:00.00	[netdaemon]
43	??	DL	0:00.00	[vmuncachedaemon]
44	??	DL	0:00.00	[if_pic_listen]
45	??	DL	0:00.02	[vmkmemdaemon]
46	??	DL	0:00.01	[cb_poll]
47	??	DL	0:00.00	[if_pfe_listen]
48	??	DL	0:00.00	[scs_housekeeping]
49	??	IL	0:00.00	[kern_dump_proc]
50	??	IL	0:00.00	[nfsiod 0]
51	??	IL	0:00.00	[nfsiod 1]
52	??	IL	0:00.00	[nfsiod 2]
53	??	IL	0:00.00	[nfsiod 3]
54	??	DL	0:00.01	[schedcpu]
55	??	DL	0:00.73	[md0]
77	??	DL	0:03.54	[md1]
98	??	DL	0:00.37	[md2]
116	??	DL	0:00.02	[md3]
137	??	DL	0:00.56	[md4]

```

158 ?? DL 0:00.15 [md5]
179 ?? DL 0:00.00 [md6]
215 ?? DL 0:00.03 [md7]
225 ?? DL 0:00.03 [md8]
1078 ?? DL 0:00.00 [jsr_kkcm]
1363 ?? SL 0:00.09 [bcmTX]
1364 ?? SL 0:00.10 [bcmXGS3AsyncTX]
1365 ?? SL 0:03.08 [bcmLINK.0]
1370 ?? Is 0:00.00 /usr/sbin/cron
1522 ?? S 0:00.00 /sbin/watchdog -t-1
1523 ?? S 0:00.05 /usr/libexec/bslockd -mp -N
1524 ?? I 0:00.01 /usr/sbin/tnetd -N
1526 ?? S 0:04.98 /usr/sbin/chassisd -N
1527 ?? S 0:00.04 /usr/sbin/alarmd -N
1528 ?? I 0:00.40 /usr/sbin/craftd -N
1529 ?? S 0:00.08 /usr/sbin/mgd -N
1532 ?? I 0:00.04 /usr/sbin/inetd -N
1533 ?? I 0:00.00 /usr/sbin/tnp.snptd -N
1534 ?? I 0:00.00 /usr/sbin/tnp.snptc -N
1536 ?? S 0:00.01 /usr/sbin/smartd -N
1540 ?? I 0:00.07 /usr/sbin/jcsd -N
1541 ?? S 0:00.11 /usr/sbin/idpd -N
1542 ?? I 0:00.00 /usr/libexec/getty Pc ttyv0
2089 ?? DL 0:00.01 [peer proxy]
2090 ?? DL 0:00.01 [peer proxy]
2091 ?? DL 0:00.01 [peer proxy]
2657 ?? S 0:00.02 /usr/sbin/dfwd -N
2658 ?? S 0:00.02 /sbin/dcd -N
2659 ?? S 0:00.05 /usr/sbin/snmpd -N
2660 ?? S 0:00.01 /usr/sbin/mib2d -N
2661 ?? S 0:00.01 /usr/sbin/pfed -N
2662 ?? S 0:00.01 /usr/sbin/irsd -N
2667 ?? S 0:00.13 /usr/sbin/ksyncd -N
2690 ?? Ss 0:00.00 mgd: (mgd) (root) (mgd)
2691 ?? R 0:00.00 /bin/ps -ax
1164 d0- S 0:00.00 /usr/sbin/usbd -N
1182 d0- S 0:00.34 /usr/sbin/eventd -N -r -s -A
1543 d0 Is+ 0:00.00 /usr/libexec/getty std.9600 ttyd0

```

lcc1-re0:

```

-----
PID TT STAT TIME COMMAND
0 ?? Wls 0:00.00 [swapper]
1 ?? ILs 0:00.17 /packages/mnt/jbase/sbin/init --
2 ?? DL 0:00.01 [g_event]
3 ?? DL 0:00.16 [g_up]
4 ?? DL 0:00.11 [g_down]
5 ?? DL 0:00.00 [thread taskq]
6 ?? DL 0:00.00 [kqueue taskq]
7 ?? DL 0:00.00 [pagedaemon]
8 ?? DL 0:00.00 [vmdaemon]
9 ?? DL 0:01.77 [pagezero]
10 ?? DL 0:00.00 [ktrace]
11 ?? RL 17:22.83 [idle]
12 ?? WL 0:00.35 [swi2: net]
13 ?? WL 0:01.20 [swi7: clock sio]
14 ?? WL 0:00.00 [swi6: vm]
15 ?? DL 0:00.10 [yarrow]
16 ?? WL 0:00.00 [swi9: +]
17 ?? WL 0:00.00 [swi8: +]
18 ?? WL 0:00.00 [swi5: cambio]

```

```

19 ?? WL 0:00.00 [swi9: task queue]
20 ?? WL 0:02.87 [irq10: bcm0 uhci1*]
21 ?? WL 0:00.02 [irq11: cb0 uhci0+*]
22 ?? DL 0:00.00 [usb0]
23 ?? DL 0:00.00 [usbtask]
24 ?? DL 0:00.00 [usb1]
25 ?? DL 0:00.05 [usb2]
26 ?? DL 0:00.00 [usb3]
27 ?? DL 0:00.00 [usb4]
28 ?? DL 0:00.00 [usb5]
29 ?? DL 0:00.04 [usb6]
30 ?? DL 0:00.00 [usb7]
31 ?? WL 0:00.00 [irq14: ata0]
32 ?? WL 0:00.00 [irq15: ata1]
33 ?? WL 0:00.00 [irq1: atkbd0]
34 ?? WL 0:00.00 [swi0: sio]
35 ?? WL 0:00.00 [swi3: ip6opt ipopt]
36 ?? WL 0:00.00 [swi4: ip6mismatch+]
37 ?? WL 0:00.00 [swi1: ipfwd]
38 ?? DL 0:00.00 [bufdaemon]
39 ?? DL 0:00.00 [vnlr]
40 ?? DL 0:00.01 [syncer]
41 ?? DL 0:00.00 [softdepflush]
42 ?? DL 0:00.00 [netdaemon]
43 ?? DL 0:00.00 [vmuncachedaemon]
44 ?? DL 0:00.00 [if_pic_listen]
45 ?? DL 0:00.02 [vmkmemdaemon]
46 ?? DL 0:00.01 [cb_poll]
47 ?? DL 0:00.00 [if_pfe_listen]
48 ?? DL 0:00.00 [scs_housekeeping]
49 ?? IL 0:00.00 [kern_dump_proc]
50 ?? IL 0:00.00 [nfsiod 0]
51 ?? IL 0:00.00 [nfsiod 1]
52 ?? IL 0:00.00 [nfsiod 2]
53 ?? IL 0:00.00 [nfsiod 3]
54 ?? DL 0:00.02 [schedcpu]
55 ?? DL 0:00.75 [md0]
77 ?? DL 0:03.40 [md1]
98 ?? DL 0:00.37 [md2]
116 ?? DL 0:00.02 [md3]
137 ?? DL 0:00.56 [md4]
158 ?? DL 0:00.15 [md5]
179 ?? DL 0:00.00 [md6]
215 ?? DL 0:00.03 [md7]
225 ?? DL 0:00.03 [md8]
1052 ?? DL 0:00.00 [jsr_kkcm]
1337 ?? SL 0:00.09 [bcmTX]
1338 ?? SL 0:00.10 [bcmXGS3AsyncTX]
1339 ?? SL 0:03.10 [bcmLINK.0]
1344 ?? Is 0:00.00 /usr/sbin/cron
1496 ?? S 0:00.00 /sbin/watchdog -t-1
1497 ?? S 0:00.05 /usr/libexec/bslockd -mp -N
1498 ?? I 0:00.01 /usr/sbin/tnetd -N
1500 ?? S 0:04.97 /usr/sbin/chassisd -N
1501 ?? S 0:00.04 /usr/sbin/alarmd -N
1502 ?? I 0:00.40 /usr/sbin/craftd -N
1503 ?? S 0:00.08 /usr/sbin/mgd -N
1506 ?? I 0:00.04 /usr/sbin/inetd -N
1507 ?? I 0:00.00 /usr/sbin/tnp.sntpd -N
1508 ?? I 0:00.00 /usr/sbin/tnp.sntpc -N
1510 ?? S 0:00.01 /usr/sbin/smartd -N

```

```

1514 ?? I      0:00.07 /usr/sbin/jcsd -N
1515 ?? S      0:00.18 /usr/sbin/idpd -N
1516 ?? I      0:00.00 /usr/libexec/getty Pc ttyv0
2068 ?? DL     0:00.01 [peer proxy]
2069 ?? DL     0:00.01 [peer proxy]
2070 ?? DL     0:00.01 [peer proxy]
2666 ?? S      0:00.02 /sbin/dcd -N
2667 ?? S      0:00.01 /usr/sbin/irsd -N
2668 ?? S      0:00.01 /usr/sbin/pfed -N
2669 ?? S      0:00.05 /usr/sbin/snmpd -N
2670 ?? S      0:00.01 /usr/sbin/mib2d -N
2671 ?? S      0:00.02 /usr/sbin/dfwd -N
2675 ?? S      0:00.13 /usr/sbin/ksyncd -N
2699 ?? Ss     0:00.00 mgd: (mgd) (root) (mgd)
2700 ?? R      0:00.00 /bin/ps -ax
1138 d0- S     0:00.00 /usr/sbin/usbd -N
1156 d0- S     0:00.37 /usr/sbin/eventd -N -r -s -A
1517 d0 Is+    0:00.00 /usr/libexec/getty std.9600 ttyd0

```

lcc2-re0:

```

-----
PID  TT  STAT    TIME COMMAND
 0  ??  Wls    0:00.00 [swapper]
 1  ??  ILs    0:00.18 /packages/mnt/jbase/sbin/init --
 2  ??  DL     0:00.01 [g_event]
 3  ??  DL     0:00.17 [g_up]
 4  ??  DL     0:00.12 [g_down]
 5  ??  DL     0:00.00 [thread taskq]
 6  ??  DL     0:00.00 [kqueue taskq]
 7  ??  DL     0:00.00 [pagedaemon]
 8  ??  DL     0:00.00 [vmdaemon]
 9  ??  DL     0:01.77 [pagezero]
10  ??  DL     0:00.00 [ktrace]
11  ??  RL    17:19.13 [idle]
12  ??  WL     0:00.36 [swi2: net]
13  ??  WL     0:01.20 [swi7: clock sio]
14  ??  WL     0:00.00 [swi6: vm]
15  ??  DL     0:00.13 [yarrow]
16  ??  WL     0:00.00 [swi9: +]
17  ??  WL     0:00.00 [swi8: +]
18  ??  WL     0:00.00 [swi5: cambio]
19  ??  WL     0:00.00 [swi9: task queue]
20  ??  WL     0:03.03 [irq10: bcm0 uhci1*]
21  ??  WL     0:00.02 [irq11: cb0 uhci0+*]
22  ??  DL     0:00.00 [usb0]
23  ??  DL     0:00.00 [usbtask]
24  ??  DL     0:00.00 [usb1]
25  ??  DL     0:00.05 [usb2]
26  ??  DL     0:00.00 [usb3]
27  ??  DL     0:00.00 [usb4]
28  ??  DL     0:00.00 [usb5]
29  ??  DL     0:00.04 [usb6]
30  ??  DL     0:00.00 [usb7]
31  ??  WL     0:00.00 [irq14: ata0]
32  ??  WL     0:00.00 [irq15: ata1]
33  ??  WL     0:00.00 [irq1: atkbd0]
34  ??  WL     0:00.00 [swi0: sio]
35  ??  WL     0:00.00 [swi3: ip6opt ipopt]
36  ??  WL     0:00.00 [swi4: ip6mismatch+]
37  ??  WL     0:00.00 [swi1: ipfwd]
38  ??  DL     0:00.00 [bufdaemon]

```

```

39 ?? DL 0:00.00 [vn1ru]
40 ?? DL 0:00.01 [syncer]
41 ?? DL 0:00.00 [softdepflush]
42 ?? DL 0:00.00 [netdaemon]
43 ?? DL 0:00.00 [vmuncachedaemon]
44 ?? DL 0:00.00 [if_pic_listen]
45 ?? DL 0:00.02 [vmkmemdaemon]
46 ?? DL 0:00.01 [cb_poll]
47 ?? DL 0:00.00 [if_pfe_listen]
48 ?? DL 0:00.00 [scs_housekeeping]
49 ?? IL 0:00.00 [kern_dump_proc]
50 ?? IL 0:00.00 [nfsiod 0]
51 ?? IL 0:00.00 [nfsiod 1]
52 ?? IL 0:00.00 [nfsiod 2]
53 ?? IL 0:00.00 [nfsiod 3]
54 ?? DL 0:00.02 [schedcpu]
55 ?? DL 0:00.75 [md0]
77 ?? DL 0:03.48 [md1]
98 ?? DL 0:00.59 [md2]
116 ?? DL 0:00.02 [md3]
137 ?? DL 0:00.56 [md4]
158 ?? DL 0:00.15 [md5]
179 ?? DL 0:00.00 [md6]
215 ?? DL 0:00.03 [md7]
225 ?? DL 0:00.03 [md8]
1052 ?? DL 0:00.00 [jsr_kkcm]
1337 ?? SL 0:00.09 [bcmTX]
1338 ?? SL 0:00.10 [bcmXGS3AsyncTX]
1339 ?? SL 0:03.22 [bcmLINK.0]
1344 ?? Is 0:00.00 /usr/sbin/cron
1496 ?? S 0:00.00 /sbin/watchdog -t-1
1497 ?? S 0:00.05 /usr/libexec/bslockd -mp -N
1498 ?? S 0:00.01 /usr/sbin/tnetd -N
1500 ?? R 0:05.17 /usr/sbin/chassisd -N
1501 ?? S 0:00.04 /usr/sbin/alarmd -N
1502 ?? I 0:00.39 /usr/sbin/craftd -N
1503 ?? S 0:00.08 /usr/sbin/mgd -N
1506 ?? I 0:00.05 /usr/sbin/inetd -N
1507 ?? I 0:00.00 /usr/sbin/tnp.sntpd -N
1508 ?? I 0:00.00 /usr/sbin/tnp.sntpc -N
1510 ?? S 0:00.01 /usr/sbin/smartd -N
1514 ?? I 0:00.07 /usr/sbin/jcsd -N
1515 ?? S 0:00.17 /usr/sbin/idpd -N
1516 ?? I 0:00.00 /usr/libexec/getty Pc ttyv0
2591 ?? DL 0:00.01 [peer proxy]
2592 ?? DL 0:00.01 [peer proxy]
2593 ?? DL 0:00.01 [peer proxy]
2597 ?? DL 0:00.00 [peer proxy]
3192 ?? S 0:00.01 /usr/sbin/irsd -N
3193 ?? S 0:00.05 /usr/sbin/snmpd -N
3194 ?? S 0:00.02 /sbin/dcd -N
3195 ?? S 0:00.01 /usr/sbin/pfed -N
3196 ?? S 0:00.01 /usr/sbin/mib2d -N
3197 ?? S 0:00.02 /usr/sbin/dfwd -N
3198 ?? S 0:00.13 /usr/sbin/ksyncd -N
3228 ?? Ss 0:00.00 mgd: (mgd) (root) (mgd)
3229 ?? R 0:00.00 /bin/ps -ax
1138 d0- S 0:00.00 /usr/sbin/usbd -N
1156 d0- S 0:00.42 /usr/sbin/eventd -N -r -s -A
1517 d0 Is+ 0:00.00 /usr/libexec/getty std.9600 ttyd0
...

```


show system
processes sfc (TX
Matrix Plus Router)

user@host> show system processes sfc 0
sfc0-re0:

```

-----
PID  TT  STAT      TIME COMMAND
  0  ??  WLS      0:00.00 [swapper]
  1  ??  SLs      0:00.18 /packages/mnt/jbase/sbin/init --
  2  ??  DL       0:00.20 [g_event]
  3  ??  DL       0:00.39 [g_up]
  4  ??  DL       0:00.32 [g_down]
  5  ??  DL       0:00.00 [thread taskq]
  6  ??  DL       0:00.09 [kqueue taskq]
  7  ??  DL       0:00.01 [pagedaemon]
  8  ??  DL       0:00.00 [vmdaemon]
  9  ??  DL       0:06.63 [pagezero]
 10  ??  DL       0:00.00 [ktrace]
 11  ??  RL      312:09.00 [idle]
 12  ??  WL       0:11.07 [swi2: net]
 13  ??  WL       0:27.70 [swi7: clock sio]
 14  ??  WL       0:00.00 [swi6: vm]
 15  ??  DL       0:03.03 [yarrow]
 16  ??  WL       0:00.00 [swi9: +]
 17  ??  WL       0:00.00 [swi8: +]
 18  ??  WL       0:00.00 [swi5: cambio]
 19  ??  WL       0:00.00 [swi9: task queue]
 20  ??  WL       0:11.46 [irq16: uhci0 uhci*]
 21  ??  DL       0:00.00 [usb0]
 22  ??  DL       0:00.00 [usbtask]
 23  ??  WL       0:39.63 [irq17: uhci1 uhci*]
 24  ??  DL       0:00.00 [usb1]
 25  ??  WL       0:00.00 [irq18: uhci2 uhci*]
 26  ??  DL       0:00.84 [usb2]
 27  ??  DL       0:00.00 [usb3]
 28  ??  DL       0:00.00 [usb4]
 29  ??  DL       0:00.00 [usb5]
 30  ??  DL       0:00.73 [usb6]
 31  ??  DL       0:00.00 [usb7]
 32  ??  WL       0:00.00 [irq14: ata0]
 33  ??  WL       0:00.00 [irq15: ata1]
 34  ??  WL       0:00.00 [irq1: atkbd0]
 35  ??  WL       0:00.00 [swi0: sio]
 36  ??  WL       0:00.00 [irq11: isab0]
 37  ??  WL       0:00.00 [swi3: ip6opt ipopt]
 38  ??  WL       0:00.00 [swi4: ip6mismatch+]
 39  ??  WL       0:00.00 [swi1: ipfwd]
 40  ??  DL       0:00.02 [bufdaemon]
 41  ??  DL       0:00.02 [vn1ru]
 42  ??  DL       0:00.39 [syncer]
 43  ??  DL       0:00.05 [softdepflush]
 44  ??  DL       0:00.00 [netdaemon]
 45  ??  DL       0:00.02 [vmuncachedaemon]
 46  ??  DL       0:00.00 [if_pic_listen]
 47  ??  DL       0:00.35 [vmkmemdaemon]
 48  ??  DL       0:00.00 [cb_poll]
 49  ??  DL       0:00.06 [if_pfe_listen]
 50  ??  DL       0:00.00 [scs_housekeeping]
 51  ??  IL       0:00.00 [kern_dump_proc]
 52  ??  IL       0:00.00 [nfsiod 0]
 53  ??  IL       0:00.00 [nfsiod 1]
 54  ??  IL       0:00.00 [nfsiod 2]
 55  ??  IL       0:00.00 [nfsiod 3]
 56  ??  DL       0:00.37 [schedcpu]

```

```

57 ?? DL 0:00.56 [md0]
79 ?? DL 0:02.58 [md1]
100 ?? DL 0:00.03 [md2]
118 ?? DL 0:00.01 [md3]
139 ?? DL 0:00.95 [md4]
160 ?? DL 0:00.12 [md5]
181 ?? DL 0:00.00 [md6]
217 ?? DL 0:00.02 [md7]
227 ?? DL 0:00.05 [md8]
1341 ?? SL 0:01.35 [bcmTX]
1342 ?? SL 0:01.69 [bcmXGS3AsyncTX]
1343 ?? SL 0:41.57 [bcmLINK.0]
1345 ?? SL 0:33.97 [bcmLINK.1]
1350 ?? Is 0:00.01 /usr/sbin/cron
1502 ?? S 0:00.01 /sbin/watchdog -t-1
1503 ?? S 0:00.86 /usr/libexec/bslockd -mp -N
1504 ?? I 0:00.01 /usr/sbin/tnetd -N
1507 ?? S 0:01.32 /usr/sbin/alarmd -N
1508 ?? S 0:14.54 /usr/sbin/craftd -N
1509 ?? S 0:01.20 /usr/sbin/mgd -N
1512 ?? S 0:00.05 /usr/sbin/inetd -N
1513 ?? S 0:00.10 /usr/sbin/tnp.sntpd -N
1517 ?? S 0:00.11 /usr/sbin/smartd -N
1525 ?? S 0:01.11 /usr/sbin/idpd -N
1526 ?? S 0:01.43 /usr/sbin/license-check -U -M -p 10 -i 10
1527 ?? I 0:00.01 /usr/libexec/getty Pc ttyv0
1616 ?? DL 0:00.30 [peer proxy]
1617 ?? DL 0:00.32 [peer proxy]
1618 ?? DL 0:00.34 [peer proxy]
1619 ?? DL 0:00.30 [peer proxy]
2391 ?? Is 0:00.01 telnetd
7331 ?? Ss 0:00.03 telnetd
9538 ?? DL 0:01.16 [jsr_kkcm]
9613 ?? DL 0:00.18 [peer proxy]
23781 ?? Ss 0:00.01 telnetd
23926 ?? Ss 0:00.03 mgd: (mgd) (regress)/dev/tty2 (mgd)
36867 ?? S 0:03.14 /usr/sbin/rpd -N
36874 ?? S 0:00.08 /usr/sbin/lmpd
36876 ?? S 0:00.17 /usr/sbin/lacpd -N
36877 ?? S 0:00.15 /usr/sbin/bfdd -N
36878 ?? S 0:05.05 /usr/sbin/ppmd -N
36907 ?? S 0:26.63 /usr/sbin/chassisd -N
37775 ?? S 0:00.01 /usr/sbin/bdbrepd -N
45727 ?? S 0:00.02 /usr/sbin/xntpd -j -N -g (ntpd)
45729 ?? S 0:00.40 /usr/sbin/l2ald -N
45730 ?? S< 0:00.13 /usr/sbin/apds -N
45731 ?? SN 0:00.10 /usr/sbin/sampled -N
45732 ?? S 0:00.03 /usr/sbin/ilmid -N
45733 ?? S 0:00.09 /usr/sbin/rmopd -N
45734 ?? S 0:00.31 /usr/sbin/cosd
45735 ?? I 0:00.00 /usr/sbin/rtspd -N
45736 ?? S 0:00.06 /usr/sbin/fsad -N
45737 ?? S 0:00.05 /usr/sbin/rdd -N
45738 ?? S 0:00.10 /usr/sbin/pppd -N
45739 ?? S 0:00.05 /usr/sbin/dfcd -N
45740 ?? S 0:00.08 /usr/sbin/lfmd -N
45741 ?? S 0:00.01 /usr/sbin/mplsoamd -N
45742 ?? I 0:00.01 /usr/sbin/sendd -N
45743 ?? S 0:00.08 /usr/sbin/appidd -N
45744 ?? S 0:00.05 /usr/sbin/mspd -N
45745 ?? S 0:00.27 /usr/sbin/jdiameterd -N

```

```

45746 ?? S      0:00.10 /usr/sbin/pfcd -N
45747 ?? S      0:00.19 /usr/sbin/lpdcd -N
45748 ?? S      0:00.64 /sbin/dcd -N
45750 ?? S      0:00.46 /usr/sbin/mib2d -N
45751 ?? S      0:00.16 /usr/sbin/dfwd -N
45752 ?? S      0:00.15 /usr/sbin/irsd -N
45764 ?? S      0:20.60 /usr/sbin/snmpd -N
56481 ?? Ss     0:00.02 telnetd
56548 ?? Rs     0:00.19 mgd: (mgd) (regress)/dev/tty0 (mgd)
56577 ?? Ss     0:00.00 mgd: (mgd) (root) (mgd)
56578 ?? R      0:00.00 /bin/ps -ax
1142 d0- S      0:00.01 /usr/sbin/usbd -N
1160 d0- S      0:29.71 /usr/sbin/eventd -N -r -s -A
6527 d0 Is+    0:00.00 /usr/libexec/getty std.9600 ttyd0
56482 p0 Is     0:00.00 login [pam] (login)
56483 p0 S       0:00.01 -csh (csh)
56547 p0 S+     0:00.02 cli
2392 p1 Is     0:00.00 login [pam] (login)
2393 p1 I       0:00.00 -csh (csh)
2394 p1 I       0:00.00 su -
2395 p1 I+     0:00.01 -su (csh)
23782 p2 Is     0:00.00 login [pam] (login)
23881 p2 I       0:00.00 -csh (csh)
23925 p2 S+     0:00.03 cli
7332 p3 Is     0:00.00 login [pam] (login)
7333 p3 I       0:00.00 -csh (csh)
23780 p3 S+     0:00.02 telnet aj

```

**show system
processes lcc wide (TX**

```

user@host> show system processes lcc 2 wide
lcc2-re0:

```

Matrix Plus Routing Matrix)

PID	TT	STAT	TIME	PROVIDER	COMMAND
0	??	Wls	0:00.00	(null)	[swapper]
1	??	ILs	0:00.19		/packages/mnt/jbase/sbin/init --
2	??	DL	0:00.02		[g_event]
3	??	DL	0:00.19		[g_up]
4	??	DL	0:00.13		[g_down]
5	??	DL	0:00.00		[thread taskq]
6	??	DL	0:00.00		[kqueue taskq]
7	??	DL	0:00.00		[pagedaemon]
8	??	DL	0:00.00		[vmdaemon]
9	??	DL	0:01.77		[pagezero]
10	??	DL	0:00.00		[ktrace]
11	??	RL	20:33.81		[idle]
12	??	WL	0:00.38		[swi2: net]
13	??	WL	0:01.43		[swi7: clock sio]
14	??	WL	0:00.00		[swi6: vm]
15	??	DL	0:00.14		[yarrow]
16	??	WL	0:00.00		[swi9: +]
17	??	WL	0:00.00		[swi8: +]
18	??	WL	0:00.00		[swi5: cambio]
19	??	WL	0:00.00		[swi9: task queue]
20	??	WL	0:03.18		[irq10: bcm0 uhci1*]
21	??	WL	0:00.03		[irq11: cb0 uhci0+*]
22	??	DL	0:00.00		[usb0]
23	??	DL	0:00.00		[usbtask]
24	??	DL	0:00.00		[usb1]
25	??	DL	0:00.06		[usb2]
26	??	DL	0:00.00		[usb3]
27	??	DL	0:00.00		[usb4]
28	??	DL	0:00.00		[usb5]
29	??	DL	0:00.05		[usb6]
30	??	DL	0:00.00		[usb7]
31	??	WL	0:00.00		[irq14: ata0]
32	??	WL	0:00.00		[irq15: ata1]
33	??	WL	0:00.00		[irq1: atkbd0]
34	??	WL	0:00.00		[swi0: sio]
35	??	WL	0:00.00		[swi3: ip6opt ipopt]
36	??	WL	0:00.00		[swi4: ip6mismatch+]
37	??	WL	0:00.00		[swi1: ipfwd]
38	??	DL	0:00.00		[bufdaemon]
39	??	DL	0:00.00		[vnlru]
40	??	DL	0:00.02		[syncer]
41	??	DL	0:00.01		[softdepflush]
42	??	DL	0:00.00		[netdaemon]
43	??	DL	0:00.00		[vmuncachedaemon]
44	??	DL	0:00.00		[if_pic_listen]
45	??	DL	0:00.03		[vmkmemdaemon]
46	??	DL	0:00.01		[cb_poll]
47	??	DL	0:00.00		[if_pfe_listen]
48	??	DL	0:00.00		[scs_housekeeping]
49	??	IL	0:00.00		[kern_dump_proc]
50	??	IL	0:00.00		[nfsiod 0]
51	??	IL	0:00.00		[nfsiod 1]
52	??	IL	0:00.00		[nfsiod 2]
53	??	IL	0:00.00		[nfsiod 3]
54	??	DL	0:00.02		[schedcpu]
55	??	DL	0:00.75		[md0]
77	??	DL	0:03.84		[md1]
98	??	DL	0:00.59		[md2]
116	??	DL	0:00.02		[md3]
137	??	DL	0:00.72		[md4]

```

158 ?? DL 0:00.15 [md5]
179 ?? DL 0:00.00 [md6]
215 ?? DL 0:00.03 [md7]
225 ?? DL 0:00.03 [md8]
1052 ?? DL 0:00.00 [jsr_kkcm]
1337 ?? SL 0:00.11 [bcmTX]
1338 ?? SL 0:00.12 [bcmXGS3AsyncTX]
1339 ?? SL 0:03.82 [bcmLINK.0]
1344 ?? Is 0:00.00 /usr/sbin/cron
1496 ?? I 0:00.00 /sbin/watchdog -t-1
1497 ?? S 0:00.06 /usr/libexec/bslockd -mp -N
1498 ?? I 0:00.01 /usr/sbin/tnetd -N
1500 ?? S 0:09.93 /usr/sbin/chassisd -N
1501 ?? S 0:00.05 /usr/sbin/alarmd -N
1502 ?? I 0:00.39 /usr/sbin/craftd -N
1503 ?? S 0:00.09 /usr/sbin/mgd -N
1506 ?? I 0:00.05 /usr/sbin/inetd -N
1507 ?? I 0:00.00 /usr/sbin/tnp.sntpd -N
1508 ?? I 0:00.00 /usr/sbin/tnp.sntpc -N
1510 ?? S 0:00.01 /usr/sbin/smartd -N
1514 ?? I 0:00.07 /usr/sbin/jcsd -N
1515 ?? S 0:00.17 /usr/sbin/idpd -N
1516 ?? I 0:00.00 /usr/libexec/getty Pc ttyv0
2591 ?? DL 0:00.01 [peer proxy]
2592 ?? DL 0:00.01 [peer proxy]
2593 ?? DL 0:00.01 [peer proxy]
2597 ?? DL 0:00.01 [peer proxy]
3192 ?? S 0:00.02 /usr/sbin/irsd -N
3193 ?? S 0:00.05 /usr/sbin/snmpd -N
3194 ?? S 0:00.04 /sbin/dcd -N
3195 ?? I 0:00.01 /usr/sbin/pfed -N
3196 ?? S 0:00.02 /usr/sbin/mib2d -N
3197 ?? I 0:00.03 /usr/sbin/dfwd -N
3198 ?? S 0:00.15 /usr/sbin/ksyncd -N
3559 ?? Ss 0:00.00 mgd: (mgd) (root) (mgd)
3560 ?? R 0:00.00 /bin/ps -ax -jppw
1138 d0- S 0:00.00 /usr/sbin/usbd -N
1156 d0- S 0:00.50 /usr/sbin/eventd -N -r -s -A
1517 d0 Is+ 0:00.00 /usr/libexec/getty std.9600 ttyd0

```

show system processes (QFX Series)

```

user@switch> show system processes
PID TT STAT TIME COMMAND
0 ?? Wls -2341043:-31.01 [swapper]
1 ?? SLs 0:01.34 /packages/mnt/jbase/sbin/init --
2 ?? DL 2:48.31 [g_event]
3 ?? DL 1:47.44 [g_up]
4 ?? DL 1:37.82 [g_down]
5 ?? DL 0:00.00 [kdm_tcp_poller]
6 ?? DL 0:00.00 [thread taskq]
7 ?? DL 0:04.86 [kqueue taskq]
9 ?? DL 0:03.94 [pagedaemon]
10 ?? DL 0:00.00 [ktrace]
11 ?? RL 0:00.00 [idle: cpu31]
12 ?? RL 0:00.00 [idle: cpu30]
13 ?? RL 0:00.00 [idle: cpu29]
14 ?? RL 0:00.00 [idle: cpu28]
15 ?? RL 0:00.00 [idle: cpu27]
16 ?? RL 0:00.00 [idle: cpu26]
17 ?? RL 0:00.00 [idle: cpu25]
18 ?? RL 0:00.00 [idle: cpu24]
19 ?? RL 0:00.00 [idle: cpu23]

```

```

20 ?? RL      0:00.00 [idle: cpu22]
21 ?? RL      0:00.00 [idle: cpu21]
22 ?? RL      0:00.00 [idle: cpu20]
23 ?? RL      0:00.00 [idle: cpu19]
24 ?? RL      0:00.00 [idle: cpu18]
25 ?? RL      0:00.00 [idle: cpu17]
26 ?? RL      0:00.00 [idle: cpu16]
27 ?? RL      0:00.00 [idle: cpu15]
28 ?? RL      0:00.00 [idle: cpu14]
29 ?? RL      0:00.00 [idle: cpu13]
30 ?? RL      0:00.00 [idle: cpu12]
31 ?? RL      0:00.00 [idle: cpu11]
32 ?? RL      0:00.00 [idle: cpu10]
33 ?? RL      0:00.00 [idle: cpu9]
34 ?? RL      18184:07.25 [idle: cpu8]
35 ?? RL      0:00.00 [idle: cpu7]
36 ?? RL      17862:11.31 [idle: cpu6]
37 ?? RL      19343:45.16 [idle: cpu5]
38 ?? RL      5192:38.30 [idle: cpu4]
39 ?? RL      0:00.00 [idle: cpu3]
40 ?? RL      19278:02.24 [idle: cpu2]
41 ?? RL      19291:00.72 [idle: cpu1]
42 ?? RL      18910:31.21 [idle: cpu0]
43 ?? WL      19:03.74 [swi2: net]
44 ?? WL      261:43.82 [swi7: clock sio]
45 ?? WL      0:00.00 [swi6: vm]
46 ?? DL      2:18.57 [yarrow]
47 ?? WL      0:00.00 [swi9: +]
48 ?? WL      0:00.00 [swi8: +]
49 ?? WL      0:12.36 [swi5: cambio]
50 ?? WL      0:00.00 [swi9: task queue]
51 ?? WL      0:00.00 [swi0: sio]
52 ?? WL      0:32.40 [irq39: ehci0]
53 ?? DL      0:00.21 [usb0]
54 ?? DL      0:00.00 [usbtask]
55 ?? WL      0:00.00 [irq22: xlr_lbus0]
56 ?? WL      0:00.00 [irq38: xlr_lbus0]
57 ?? WL      0:00.00 [swi3: ip6opt ipopt]
58 ?? WL      0:00.00 [swi4: ip6mismatch+]
59 ?? WL      0:00.00 [swi1: ipfwd]
60 ?? DL      0:18.65 [pagezero]
61 ?? DL      0:18.59 [bufdaemon]
62 ?? DL      1:10.44 [vnlru_mem]
63 ?? DL      1:51.66 [syncer]
64 ?? DL      0:20.22 [vnlru]
65 ?? DL      0:40.48 [softdepflush]
66 ?? DL      0:00.00 [netdaemon]
67 ?? DL      20:47.67 [vmkmemdaemon]
68 ?? DL      0:00.00 [if_pfe_listen]
69 ?? SL      0:02.80 [kdm_checkkcore]
70 ?? SL      0:03.34 [kdm_savekcore]
71 ?? SL      0:04.31 [kdm_livekcore]
72 ?? SL      0:06.14 [kdm_logger]
73 ?? SL      0:04.31 [kdm_kdb]
74 ?? SL      0:00.02 [devrt_kernel_thread]
75 ?? DL      0:21.54 [vmuncachedaemon]
76 ?? DL      0:00.00 [if_pic_listen0]
77 ?? SL      0:00.00 [nfsiod 0]
78 ?? SL      0:00.00 [nfsiod 1]
79 ?? SL      0:00.00 [nfsiod 2]
80 ?? SL      0:00.00 [nfsiod 3]

```

```

81 ?? WL      5:59.98 [irq13: +]
82 ?? RL    105:06.81 [pkt_sender: cpu0]
83 ?? DL      0:03.62 [md0]
95 ?? DL      0:37.04 [md1]
115 ?? DL     0:06.01 [md2]
135 ?? DL     0:00.75 [md3]
155 ?? DL     0:21.17 [md4]
175 ?? DL     0:01.90 [md5]
195 ?? DL     0:06.26 [md6]
231 ?? DL     0:00.01 [md7]
755 ?? Ss     0:04.17 /usr/sbin/cron
847 ?? S      0:00.10 /usr/sbin/tnetd -N
849 ?? S      0:06.82 /usr/sbin/mgd -N
850 ?? S      0:00.32 /usr/sbin/inetd -N
852 ?? S      1:05.34 /usr/sbin/dhcpd -N
853 ?? S      0:00.18 /usr/sbin/inetd -p /var/run/inetd_4.pid -N -JU __juni
855 ?? L    1181:02.21 /usr/sbin/dc-pfe -N (pafxpc)
857 ?? S      17:55.86 /usr/sbin/vccpd -N
896 ?? S      93:43.45 /usr/sbin/chassism -N
953 ?? S      0:02.89 /sbin/watchdog -t-1
954 ?? S      3:34.00 /sbin/dcd -N
955 ?? S     10:30.13 /usr/sbin/chassisd -N
956 ?? DL     0:00.21 [peer proxy]
957 ?? S      4:07.43 /usr/sbin/alarmd -N
958 ?? S      0:31.69 /usr/sbin/craftd -N
959 ?? S      0:55.16 /usr/sbin/mib2d -N
960 ?? S      3:40.64 /usr/sbin/rpd -N
961 ?? S      0:00.03 /usr/sbin/tnp.sntpd -N
962 ?? S      0:51.94 /usr/sbin/pfed -N
963 ?? S      0:47.31 /usr/sbin/rmopd -N
964 ?? S      0:33.65 /usr/sbin/cosd
965 ?? S      1:48.41 /usr/sbin/ppmd -N
966 ?? S      0:07.18 /usr/sbin/dfwd -N
967 ?? S      1:02.56 /usr/sbin/bfdd -N
968 ?? S      0:00.63 /usr/sbin/rdd -N
969 ?? S      0:40.61 /usr/sbin/dfcd -N
971 ?? S      0:07.81 /usr/sbin/bdbrepd -N
972 ?? S      0:00.28 /usr/sbin/sendd -N
973 ?? S      1:37.69 /usr/sbin/xntpd -j -N -g -JU __juniper_private4__ (nt
974 ?? S      5:56.28 /usr/sbin/snmpd -N -JU __juniper_private4__
975 ?? S     16:46.82 /usr/sbin/jdiameterd -N
976 ?? S      2:34.13 /usr/sbin/eswd -N
977 ?? S      1:03.05 /usr/sbin/sflowd -N
978 ?? S      0:22.30 /usr/sbin/fcd -N
979 ?? S      1:07.01 /usr/sbin/vccpdf -N
982 ?? S      0:25.25 /usr/sbin/mcsnoopd -N
983 ?? S      3:45.68 /usr/sbin/rpdf -N
1043 ?? S      0:37.87 /usr/sbin/lacpd -N
1048 ?? DL     0:01.29 [peer proxy]
1111 ?? WL     0:00.00 [swi2: FMNITHRD+]
1112 ?? DL     0:00.03 [peer proxy]
12816 ?? S     15:35.32 /usr/sbin/sfid -N
30893 ?? Ss    0:00.65 sshd: tlewis@tty0 (sshd)
30897 ?? Ss    0:00.15 mgd: (mgd) (tlewis)/dev/tty0 (mgd)
30905 ?? Ss    0:00.64 sshd: tlewis@tty1 (sshd)
30909 ?? Ss    0:00.15 mgd: (mgd) (tlewis)/dev/tty1 (mgd)
30910 ?? Ss    0:01.26 sshd: tcheng@tty2 (sshd)
30914 ?? Ss    0:00.80 mgd: (mgd) (tcheng)/dev/tty2 (mgd)
30937 ?? R      0:00.03 /bin/ps -ax
661  d0- S      0:21.24 /usr/sbin/eventd -N -r -s -A
860  d0 Ss+     0:00.07 /usr/libexec/getty std.9600 ttyd0

```

```
30896 p0 Ss+ 0:00.55 -cli (cli)
30908 p1 Ss+ 0:00.50 -cli (cli)
30913 p2 Ss+ 0:00.85 -cli (cli)
```


show system queues

Syntax	show system queues
Syntax (TX Matrix Router)	show system queues <all-chassis all-lcc lcc <i>number</i> scc>
Syntax (TX Matrix Plus Router)	show system queues <all-chassis all-lcc lcc <i>number</i> sfc <i>number</i> >
Syntax (MX Series Router)	show system queues <all-members> <local> <member <i>member-id</i> >
Release Information	Command introduced before Junos OS Release 7.4. sfc option introduced for the TX Matrix Plus router in Junos OS Release 9.6.
Description	Display queue statistics.
Options	<p>all-chassis—(TX Matrix routers and TX Matrix Plus routers only) (Optional) On a TX Matrix router, display system queue statistics for all the T640 routers in the chassis that are connected to the TX Matrix router. On a TX Matrix Plus router, display system queue statistics for all the T1600 or T4000 routers in the chassis that are connected to the TX Matrix Plus router.</p> <p>all-lcc—(TX Matrix routers and TX Matrix Plus routers only) (Optional) Display system queue statistics for all LCC chassis attached to the TX Matrix or TX Matrix Plus router.</p> <p>all-members—(MX Series routers only) (Optional) Display system queue statistics for all members of the Virtual Chassis configuration.</p> <p>lcc <i>number</i>—(TX Matrix routers and TX Matrix Plus routers only) (Optional) On a TX Matrix router, display system queue statistics for a specific T640 router that is connected to the TX Matrix router. On a TX Matrix Plus router, display system queue statistics for a specific connected router that is connected to the TX Matrix Plus router.</p> <p>Replace <i>number</i> with the following values depending on the LCC configuration:</p> <ul style="list-style-type: none"> • 0 through 3, when T640 routers are connected to a TX Matrix router in a routing matrix. • 0 through 3, when T1600 routers are connected to a TX Matrix Plus router in a routing matrix. • 0 through 7, when T1600 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix. • 0, 2, 4, or 6, when T4000 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.

local—(MX Series routers only) (Optional) Display system queue statistics for the local Virtual Chassis member.

member *member-id*—(MX Series routers only) (Optional) Display system queue statistics for the specified member of the Virtual Chassis configuration. Replace ***member-id*** with a value of 0 or 1.

scc—(TX Matrix routers only) (Optional) Display queue statistics for the TX Matrix router.

sfc *number*—(TX Matrix Plus routers only) (Optional) Display system queue statistics for the TX Matrix Plus router. Replace ***number*** with 0.

Additional Information By default, when you issue the **show system queues** command on the master Routing Engine of a TX Matrix router or a TX Matrix Plus router, the command is broadcast to all the master Routing Engines of the LCCs connected to it in the routing matrix. Likewise, if you issue the same command on the backup Routing Engine of a TX Matrix or a TX Matrix Plus router, the command is broadcast to all backup Routing Engines of the LCCs that are connected to it in the routing matrix.

Required Privilege Level maintenance

Related Documentation • [Routing Matrix with a TX Matrix Plus Router Solutions Page](#)

List of Sample Output [show system queues on page 289](#)
[show system queues scc \(TX Matrix Router\) on page 289](#)
[show system queues sfc \(TX Matrix Router\) on page 289](#)

Output Fields [Table 10 on page 288](#) lists the output fields for the **show system queues** command. Output fields are listed in the approximate order in which they appear.

Table 10: show system queues Output Fields

Field Name	Field Description
Output interface	Interface on the router on which the queue exists: <ul style="list-style-type: none"> • fxp0—Management Ethernet interface • fxp1—Internal Ethernet interface • lsi—Internally generated interface and not configurable • dsc—Discard interface
bytes	Number of bytes in the queue.
max	Maximum number of bytes allowed in the queue.
packets	Number of packets in the queue.
max	Maximum number of packets allowed in the queue.
drops	Number of packets dropped from the queue.

Sample Output

show system queues

```
user@host> show system queues
output interface      bytes      max  packets      max  drops
fxp0                  0    1250000      0    4166        6
fxp1                  0    1250000      0    4166       19
lsi                   0     12500       0     41         0
dsc                   0         0       0         0         0
```

show system queues
scc (TX Matrix Router)

```
user@host> show system queues scc
output interface      bytes      max  packets      max  drops
fxp0                  0    1250000      0    4166         5
lsi                   0     12500       0     41         0
dsc                   0         0       0         0         0
lo0                   0         0       0         0         0
bcm0                  0   12500000      0   30000         0
em0                   0   12500000      0   30000         0
gre                   0     12500       0     41         0
ipip                  0     12500       0     41         0
tap                   0         0       0         0         0
pime                  0     12500       0     41         0
pimd                  0     12500       0     41         0
mtun                  0     12500       0     41         0
so-1/0/0              0     12500       0     416         0
so-1/1/0              0     12500       0     416         0
so-21/0/0             0     12500       0     416         0
ge-21/1/0             0   1250000      0   4166         0
ge-21/1/1             0   1250000      0   4166         3
ge-21/2/0             0   1250000      0   4166         0
ge-21/2/1             0   1250000      0   4166         3
so-21/3/0             0     12500       0     416         0
so-0/0/0              0     12500       0     416         0
so-0/1/0              0     12500       0     416         0
so-0/2/0              0     12500       0     416         0
pd-0/3/0              0     12500       0     41         0
pe-0/3/0              0     12500       0     41         0
gr-0/3/0              0     12500       0     41         0
ip-0/3/0              0     12500       0     41         0
vt-0/3/0              0     12500       0     41         0
mt-0/3/0              0     12500       0     41         0
lt-0/3/0              0     12500       0     41         0
so-17/0/0             0     12500       0     416         0
input protocol      bytes      max  packets      max  drops
splfwdq              0   1000000      0   1000         0
splnetq              0   1000000      0   1000         0
arpintrq             0     1000       0     50         0
optionq              0    200000      0    200         0
icmpq                0     50000       0     50         0
frlmiq               0         0       0         0         0
spppintrq            0     25000       0    250         0
clnlintrq            0    200000      0    200         0
tnpintrq             0   1250000      0   4166         0
tagintrq             0    200000      0    200         0
tagfragq            0    200000      0    200         0
```

show system queues
sfc (TX Matrix Router)

```
user@host> show system queues sfc 0
sfc0-re0:
-----
```

output interface	bytes	max	packets	max	drops
ixgbe1	0	125000000	0	45000	4384
ixgbe0	0	125000000	0	45000	0
lsi	0	12500	0	41	0
dsc	0	0	0	0	0
lo0	0	0	0	0	0
em0	0	12500000	0	41666	1
gre	0	12500	0	41	0
ipip	0	12500	0	41	0
tap	0	0	0	0	0
pime	0	12500	0	41	0
pimd	0	12500	0	41	0
mtun	0	12500	0	41	0
xe-12/0/0	0	1250000	0	4166	0
xe-12/0/1	0	1250000	0	4166	0
xe-12/0/2	0	1250000	0	4166	0
xe-12/0/3	0	1250000	0	4166	0
xe-12/1/0	0	1250000	0	4166	0
xe-12/1/1	0	1250000	0	4166	0
xe-12/1/2	0	1250000	0	4166	0
xe-12/1/3	0	1250000	0	4166	0
xe-20/0/0	0	1250000	0	4166	0
xe-20/0/1	0	1250000	0	4166	0
xe-20/0/2	0	1250000	0	4166	0
xe-20/0/3	0	1250000	0	4166	0
xe-20/1/0	0	1250000	0	4166	0
xe-20/1/1	0	1250000	0	4166	0
xe-20/1/2	0	1250000	0	4166	0
xe-20/1/3	0	1250000	0	4166	0
ge-15/0/0	0	1250000	0	4166	75
ge-15/0/1	0	1250000	0	4166	0
ge-15/0/2	0	1250000	0	4166	75
ge-15/0/3	0	1250000	0	4166	75
ge-15/0/4	0	1250000	0	4166	0
ge-15/0/5	0	1250000	0	4166	0
ge-15/0/6	0	1250000	0	4166	0
ge-15/0/7	0	1250000	0	4166	0
ge-15/0/8	0	1250000	0	4166	0
ge-15/0/9	0	1250000	0	4166	0
xe-4/0/0	0	1250000	0	4166	0
xe-4/0/1	0	1250000	0	4166	0
xe-4/0/2	0	1250000	0	4166	0
xe-4/0/3	0	1250000	0	4166	0
xe-4/1/0	0	1250000	0	4166	0
xe-4/1/1	0	1250000	0	4166	0
xe-4/1/2	0	1250000	0	4166	0
xe-4/1/3	0	1250000	0	4166	0
xe-24/0/0	0	1250000	0	4166	0
xe-24/0/1	0	1250000	0	4166	0
xe-24/0/2	0	1250000	0	4166	0
xe-24/0/3	0	1250000	0	4166	0
xe-24/1/0	0	1250000	0	4166	0
xe-24/1/1	0	1250000	0	4166	0
xe-24/1/2	0	1250000	0	4166	0
xe-24/1/3	0	1250000	0	4166	0
ge-7/0/0	0	1250000	0	4166	0
ge-7/0/1	0	1250000	0	4166	0
ge-7/0/2	0	1250000	0	4166	0
ge-7/0/3	0	1250000	0	4166	75
ge-7/0/4	0	1250000	0	4166	0
ge-7/0/5	0	1250000	0	4166	0

ge-7/0/6	0	1250000	0	4166	0
ge-7/0/7	0	1250000	0	4166	0
ge-7/0/8	0	1250000	0	4166	0
ge-7/0/9	0	1250000	0	4166	0
so-7/1/0	0	125000	0	416	0
so-7/2/0	0	125000	0	416	0
xe-21/0/0	0	1250000	0	4166	0
xe-21/0/1	0	1250000	0	4166	0
xe-21/0/2	0	1250000	0	4166	0
xe-21/0/3	0	1250000	0	4166	0
xe-21/1/0	0	1250000	0	4166	0
xe-21/1/1	0	1250000	0	4166	0
xe-21/1/2	0	1250000	0	4166	0
xe-21/1/3	0	1250000	0	4166	0
xe-14/0/0	0	1250000	0	4166	0
xe-14/0/1	0	1250000	0	4166	0
xe-14/0/2	0	1250000	0	4166	0
xe-14/0/3	0	1250000	0	4166	0
xe-14/1/0	0	1250000	0	4166	0
xe-14/1/1	0	1250000	0	4166	0
xe-14/1/2	0	1250000	0	4166	0
xe-14/1/3	0	1250000	0	4166	0
xe-25/0/0	0	1250000	0	4166	0
xe-25/0/1	0	1250000	0	4166	0
xe-25/0/2	0	1250000	0	4166	0
xe-25/0/3	0	1250000	0	4166	0
xe-25/1/0	0	1250000	0	4166	0
xe-25/1/1	0	1250000	0	4166	0
xe-25/1/2	0	1250000	0	4166	0
xe-25/1/3	0	1250000	0	4166	0
so-22/0/0	0	125000	0	416	0
so-22/0/1	0	125000	0	416	0
so-22/0/2	0	125000	0	416	0
so-22/0/3	0	125000	0	416	0
xe-22/1/0	0	1250000	0	4166	0
xe-22/1/1	0	1250000	0	4166	0
xe-22/1/2	0	1250000	0	4166	0
xe-22/1/3	0	1250000	0	4166	0
xe-6/0/0	0	1250000	0	4166	0
xe-6/0/1	0	1250000	0	4166	0
xe-6/0/2	0	1250000	0	4166	0
xe-6/0/3	0	1250000	0	4166	0
xe-6/1/0	0	1250000	0	4166	0
xe-6/1/1	0	1250000	0	4166	0
xe-6/1/2	0	1250000	0	4166	0
xe-6/1/3	0	1250000	0	4166	0
xe-26/0/0	0	1250000	0	4166	0
xe-26/0/1	0	1250000	0	4166	0
xe-26/0/2	0	1250000	0	4166	0
xe-26/0/3	0	1250000	0	4166	0
xe-26/1/0	0	1250000	0	4166	0
xe-26/1/1	0	1250000	0	4166	0
xe-26/1/2	0	1250000	0	4166	0
xe-26/1/3	0	1250000	0	4166	0
ge-31/0/0	0	1250000	0	4166	0
ge-31/0/1	0	1250000	0	4166	0
ge-31/0/2	0	1250000	0	4166	0
ge-31/0/3	0	1250000	0	4166	0
ge-31/0/4	0	1250000	0	4166	75
ge-31/0/5	0	1250000	0	4166	0
ge-31/0/6	0	1250000	0	4166	75

ge-31/0/7	0	1250000	0	4166	0
ge-31/0/8	0	1250000	0	4166	0
ge-31/0/9	0	1250000	0	4166	0
pd-31/1/0	0	12500	0	41	0
pe-31/1/0	0	12500	0	41	0
gr-31/1/0	0	12500	0	41	0
ip-31/1/0	0	12500	0	41	0
vt-31/1/0	0	12500	0	41	0
mt-31/1/0	0	12500	0	41	0
lt-31/1/0	0	12500	0	41	0
so-29/0/0	0	125000	0	416	0
so-29/0/1	0	125000	0	416	0
so-29/0/2	0	125000	0	416	0
so-29/0/3	0	125000	0	416	0
xe-29/1/0	0	1250000	0	4166	0
xe-29/1/1	0	1250000	0	4166	0
xe-29/1/2	0	1250000	0	4166	0
xe-29/1/3	0	1250000	0	4166	0
so-28/0/0	0	125000	0	416	0
so-28/0/1	0	125000	0	416	0
so-28/0/2	0	125000	0	416	0
so-28/0/3	0	125000	0	416	0
ge-23/0/0	0	1250000	0	4166	0
ge-23/0/1	0	1250000	0	4166	0
ge-23/0/2	0	1250000	0	4166	0
ge-23/0/3	0	1250000	0	4166	0
ge-23/0/4	0	1250000	0	4166	0
ge-23/0/5	0	1250000	0	4166	0
ge-23/0/6	0	1250000	0	4166	0
ge-23/0/7	0	1250000	0	4166	0
ge-23/0/8	0	1250000	0	4166	0
ge-23/0/9	0	1250000	0	4166	0
input protocol	bytes	max	packets	max	drops
sp1fwdq	0	1000000	0	1000	0
sp1netq	0	1000000	0	1000	0
arpintrq	0	1000	0	50	0
optionq	0	200000	0	200	0
icmpq	0	50000	0	50	0
frlmiq	0	0	0	0	0
spppintrq	0	25000	0	250	0
atmctlpktq	0	0	0	0	0
atmoamq	0	0	0	0	0
tnpintrq	0	1250000	0	4166	0
tagintrq	0	200000	0	200	0
tagfragq	0	200000	0	200	0

show system reboot

Syntax	show system reboot <both-routing-engines>
Syntax (EX Series Switches)	show system reboot <all-members> <both-routing-engines> <local> <member <i>member-id</i> >
Syntax (TX Matrix Router)	show system reboot <all-chassis all-lcc lcc <i>number</i> scc> <both-routing-engines>
Syntax (TX Matrix Plus Router)	show system reboot <all-chassis all-lcc lcc <i>number</i> sfc <i>number</i> > <both-routing-engines>
Syntax (MX Series Router)	show system reboot <all-members> <both-routing-engines> <local> <member <i>member-id</i> >
Syntax (QFX Series)	show system reboot <both-routing-engines> <infrastructure <i>name</i> > <interconnect-device <i>name</i> > <node-device <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 pending system reboots or halts.
Options	<p>none—Display pending reboots or halts on the active Routing Engine.</p> <p>all-chassis—(TX Matrix routers and TX Matrix Plus routers only) (Optional) On a TX Matrix router, display halt or reboot request information for all the T640 routers in the chassis that are connected to the TX Matrix router. On a TX Matrix Plus router, display halt or reboot request information for all the T1600 or T4000 routers in the chassis that are connected to the TX Matrix Plus router.</p> <p>all-members—(EX4200 switches and MX Series routers only) (Optional) Display halt or reboot request information for all members of the Virtual Chassis configuration.</p> <p>all-lcc—(TX Matrix routers and TX Matrix Plus router only) (Optional) On a TX Matrix router, display system halt or reboot request information for all T640 routers</p>

connected to the TX Matrix router. On a TX Matrix Plus router, display halt or reboot request information for all connected T1600 or T4000 LCCs.

both-routing-engines—(Systems with multiple Routing Engines) (Optional) Display halt or reboot request information on both Routing Engines.

infrastructure *name*—(QFabric systems only) (Optional) Display reboot request information on the fabric manager Routing Engines and fabric control Routing Engines.

interconnect-device *name*—(QFabric systems only) (Optional) Display reboot request information on the Interconnect device.

lcc *number*—(TX Matrix routers and TX Matrix Plus routers only) (Optional) On a TX Matrix router, display halt or reboot request information for a specific T640 router that is connected to the TX Matrix router. On a TX Matrix Plus router, display halt or reboot request information for a specific router that is connected to the TX Matrix Plus router.

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

- 0 through 3, when T640 routers are connected to a TX Matrix router in a routing matrix.
- 0 through 3, when T1600 routers are connected to a TX Matrix Plus router in a routing matrix.
- 0 through 7, when T1600 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.
- 0, 2, 4, or 6, when T4000 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.

local—(EX4200 switches and MX Series routers only) (Optional) Display halt or reboot request information for the local Virtual Chassis member.

member *member-id*—(EX4200 switches and MX Series routers only) (Optional) Display halt or reboot request information for 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 reboot request information on the Node group.

scc—(TX Matrix router only) (Optional) Display halt or reboot request information for the TX Matrix router (or switch-card chassis).

sfc—(TX Matrix Plus router only) (Optional) Display halt or reboot request information for the TX Matrix Plus router.

Additional Information By default, when you issue the **show system reboot** 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 the TX Matrix router) or T1600 (in a routing matrix based on the 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 the TX Matrix router) or T1600 (in a routing matrix based on the TX Matrix Plus router) backup Routing Engines that are connected to it.

Required Privilege Level maintenance

Related Documentation [• Routing Matrix with a TX Matrix Plus Router Solutions Page](#)

List of Sample Output [show system reboot on page 295](#)
[show system reboot all-lcc \(TX Matrix Router\) on page 295](#)
[show system reboot sfc \(TX Matrix Plus Router\) on page 295](#)
[show system reboot \(QFX3500 Switch\) on page 295](#)

Sample Output

show system reboot user@host> **show system reboot**
 reboot requested by root at Wed Feb 10 17:40:46 1999
 [process id 17885]

show system reboot all-lcc (TX Matrix Router) user@host> **show system reboot all-lcc**
 lcc0-re0:

 No shutdown/reboot scheduled.


 lcc2-re0:

 No shutdown/reboot scheduled.

show system reboot sfc (TX Matrix Plus Router) user@host> **show system sfc 0**
 No shutdown/reboot scheduled.

show system reboot (QFX3500 Switch) user@switch> **show system reboot**
 No shutdown/reboot scheduled.

show system rollback


Syntax	<code>show system rollback <i>number</i></code> <code><compare <i>number</i>></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	Display the contents of a previously committed configuration, or the differences between two previously committed configurations.
	<div> NOTE: The <code>show system rollback</code> command is a purely operational mode command and cannot be issued with <code>run</code> from the configuration mode.</div>
Options	<p><i>number</i>—Number of a configuration to view. The output displays the configuration. The range of values is 0 through 49.</p> <p><code>compare <i>number</i></code>—(Optional) Number of another previously committed (rollback) configuration to compare to rollback <i>number</i>. The output displays the differences between the two configurations. The range of values is 0 through 49.</p>
Required Privilege Level	view
List of Sample Output	show system rollback compare on page 297

Sample Output

`show system rollback`
`compare`

```
user@host> show system rollback 3 compare 1
[edit]
+ interfaces {
+   ge-1/1/1 {
+     unit 0 {
+       family inet {
+         filter {
+           input mf_plp;
+         }
+         address 14.1.1.1/30;
+       }
+     }
+   }
+   ge-1/2/1 {
+     unit 0 {
+       family inet {
+         filter {
+           input mf_plp;
+         }
+         address 13.1.1.1/30;
+       }
+     }
+   }
+   ge-1/3/0 {
+     unit 0 {
+       family inet {
+         filter {
+           input mf_plp;
+         }
+         address 12.1.1.1/30;
+       }
+     }
+   }
+ }
```

show system snapshot

Syntax	show system snapshot
Syntax (EX Series Switches)	show system snapshot <all-members local member <i>member-id</i> > <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	<p>Display information about the backup software:</p> <ul style="list-style-type: none">• 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.
	<div> NOTE: To back up software, use the request system snapshot command.</div>
Options	<p>none—Display information about the backup software.</p> <p>all-members local member <i>member-id</i>—(EX Series switch Virtual Chassis only) (Optional) Display the snapshot in a Virtual Chassis:</p> <ul style="list-style-type: none">• 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 <i>member-id</i>—Display the snapshot for the specified member of the Virtual Chassis. <p>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.</p>
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none">• request system snapshot on page 226
List of Sample Output	show system snapshot (Router) on page 300

[show system snapshot media external \(Switch\) on page 300](#)

[show system snapshot media internal \(Switch\) on page 300](#)

Output Fields [Table 11 on page 299](#) lists the output fields for the **show system snapshot** command. Output fields are listed in the approximate order in which they appear.

Table 11: 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 software

Syntax	show system software <detail>
Syntax (EX Series Switches)	show system software <all-members> <detail> <local> <member <i>member-id</i> >
Syntax (TX Matrix Router)	show system software <all-chassis all-lcc lcc <i>number</i> scc> <detail>
Syntax (TX Matrix Plus Router)	show system software <all-chassis all-lcc lcc <i>number</i> sfc <i>number</i> > <detail>
Syntax (J Series Routers)	show system software <backup> <detail>
Syntax (QFX Series)	show system software <detail> <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 the Junos OS extensions loaded on your router or switch.
Options	<p>none—Display standard information about all loaded Junos OS extensions.</p> <p>all-chassis—(TX Matrix routers and TX Matrix Plus routers only) (Optional) Display system software information for all the T640 routers (TX Matrix Router) or all the routers (TX Matrix Plus Router) in the chassis.</p> <p>all-lcc—(TX Matrix routers and TX Matrix Plus routers only) (Optional) On a TX Matrix router, display system software information for all T640 routers connected to the TX Matrix router. On a TX Matrix Plus router, display system software information for all connected T1600 or T4000 LCCs.</p> <p>all-members—(EX4200 switches only) (Optional) Display the system software running on all members of the Virtual Chassis configuration.</p> <p>backup—(J Series routers only) (Optional) Display the status of old system software packages only.</p>

detail—(Optional) Display detailed information about available Junos OS extensions.

infrastructure *name*—(QFabric systems only) (Optional) Display the system software running on the fabric control Routing Engine and the fabric manager Routing Engine.

interconnect-device *name*—(QFabric systems only) (Optional) Display the system software running on the Interconnect device.

lcc *number*—(TX Matrix routers and TX Matrix Plus routers only) (Optional) On a TX Matrix router, display system software information for a specific T640 router that is connected to the TX Matrix router. On a TX Matrix Plus router, display system software information for a specific router that is connected to the TX Matrix Plus router. Replace *number* with the following values depending on the LCC configuration:

- 0 through 3, when T640 routers are connected to a TX Matrix router in a routing matrix.
- 0 through 3, when T1600 routers are connected to a TX Matrix Plus router in a routing matrix.
- 0 through 7, when T1600 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.
- 0, 2, 4, or 6, when T4000 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.

local—(EX4200 switches only) (Optional) Display the system software running on the local Virtual Chassis member.

member *member-id*—(EX4200 switches only) (Optional) Display the system software running on the specified member of the Virtual Chassis configuration. Replace *member-id* with a value from 0 through 9.

node-group *name*—(QFabric systems only) (Optional) Display the system software running on the Node group.

scc—(Routing matrix only) (Optional) Display the system software running on a TX Matrix router (or switch-card chassis).

sfc—(TX Matrix Plus routers only) (Optional) Display system software information for the TX Matrix Plus router.

Required Privilege Level

maintenance

Related Documentation

- [Routing Matrix with a TX Matrix Plus Router Solutions Page](#)

List of Sample Output

[show system software on page 304](#)
[show system software \(TX Matrix Plus Router\) on page 304](#)
[show system software \(QFX Series\) on page 308](#)

Output Fields When you enter this command, you are provided a list of Junos OS packages installed on the router and their corresponding Junos OS release number.

Sample Output

```
show system software 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]

Information for jpfe:

Comment:
JUNOS Packet Forwarding Engine Support (M20/M40) [7.2R1.7]

Information for jroute:

Comment:
JUNOS Routing Software Suite [7.2R1.7]

Information for junos:

Comment:
JUNOS Base OS boot [7.2R1.7]
```

```
show system software user@host> show system software
(TX Matrix Plus sfc0-re0:
Router) -----
Information for jbase:

Comment:
JUNOS Base OS Software Suite [9.6-20090515.0]

Information for jcrypto:

Comment:
JUNOS Crypto Software Suite [9.6-20090515.0]
```

Information for jdocs:

Comment:

JUNOS Online Documentation [9.6-20090515.0]

Information for jkernel:

Comment:

JUNOS Kernel Software Suite [9.6-20090515.0]

Information for jpfe:

Comment:

JUNOS Packet Forwarding Engine Support (T-Series) [9.6-20090515.0]

Information for jpfe-common:

Comment:

JUNOS Packet Forwarding Engine Support (M/T Common) [9.6-20090515.0]

Information for jroute:Comment:

JUNOS Routing Software Suite [9.6-20090515.0]

Information for jservices-aacl:

Comment:

JUNOS Services ACL Container package [9.6-20090515.0]

Information for jservices-appid:

Comment:

JUNOS AppId Services [9.6-20090515.0]

Information for jservices-bgf:

Comment:

JUNOS Border Gateway Function package [9.6-20090515.0]

Information for jservices-idp:

Comment:

JUNOS IDP Services [9.6-20090515.0]

Information for jservices-llpdf:

Comment:

JUNOS Services LL-PDF Container package [9.6-20090515.0]

Information for jservices-sfw:

Comment:

JUNOS Services Stateful Firewall [9.6-20090515.0]

Information for jservices-voice:

Comment:

JUNOS Voice Services Container package [9.6-20090515.0]

Information for junos:

Comment:

JUNOS Base OS boot [9.6-20090515.0]

...

lcc0-re0:

Information for jbase:

Comment:

JUNOS Base OS Software Suite [9.6-20090515.0]

Information for jcrypto:

Comment:

JUNOS Crypto Software Suite [9.6-20090515.0]

Information for jdocs:

Comment:

JUNOS Online Documentation [9.6-20090515.0]

Information for jkernel:

Comment:

JUNOS Kernel Software Suite [9.6-20090515.0]

Information for jpfe:

Comment:

JUNOS Packet Forwarding Engine Support (T-Series) [9.6-20090515.0]

Information for jpfe-common:

Comment:

JUNOS Packet Forwarding Engine Support (M/T Common) [9.6-20090515.0]

Information for jroute:

Comment:

JUNOS Routing Software Suite [9.6-20090515.0]

Information for jservices-aac1:

Comment:

JUNOS Services AACL Container package [9.6-20090515.0]

Information for jservices-appid:

Comment:

JUNOS AppId Services [9.6-20090515.0]

Information for jservices-bgf:

Comment:

JUNOS Border Gateway Function package [9.6-20090515.0]

Information for jservices-idp:

Comment:

JUNOS IDP Services [9.6-20090515.0]

Information for jservices-llpdf:

Comment:

JUNOS Services LL-PDF Container package [9.6-20090515.0]

Information for jservices-sfw:

Comment:

JUNOS Services Stateful Firewall [9.6-20090515.0]

Information for jservices-voice:

Comment:

JUNOS Voice Services Container package [9.6-20090515.0]

Information for junos:

Comment:

JUNOS Base OS boot [9.6-20090515.0]

lcc1-re0:

Information for jbase:

Comment:
JUNOS Base OS Software Suite [9.6-20090515.0]

Information for jcrypto:

Comment:
JUNOS Crypto Software Suite [9.6-20090515.0]
...

**show system software
(QFX Series)**

user@switch> **show system software**
Information for jbase:

Comment:
JUNOS Base OS Software Suite [11.3-20110730.0]

Information for jcrypto:

Comment:
JUNOS Crypto Software Suite [11.3-20110730.0]

Information for jdocs:

Comment:
JUNOS Online Documentation [11.3-20110730.0]

Information for jkernel:

Comment:
JUNOS Kernel Software Suite [11.3-20110730.0]

Information for jpfe:

Comment:
JUNOS Packet Forwarding Engine Support (QFX) [11.3-20110730.0]

Information for jroute:

Comment:
JUNOS Routing Software Suite [11.3-20110730.0]

Information for jswitch:

Comment:
JUNOS Enterprise Software Suite [11.3-20110730.0]

Information for junos:

Comment:
JUNOS Base OS boot [11.3-20110730.0]

Information for jweb:

Comment:
JUNOS Web Management [11.3-20110730.0]

show system statistics

Syntax	show system statistics
Syntax (EX Series Switches)	show system statistics <all-members> <local> <member <i>member-id</i> >
Syntax (TX Matrix Router)	show system statistics <all-chassis all-lcc lcc <i>number</i> scc>
Syntax (TX Matrix Plus Router)	show system statistics <all-chassis all-lcc lcc <i>number</i> sfc <i>number</i> >
Syntax (MX Series Router)	show system statistics <all-members> <local> <member <i>member-id</i> >
Syntax (QFX Series)	show system statistics
Release Information	Command introduced before JUNOS 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 Release 9.6. Command introduced in Junos OS Release 11.1 for the QFX Series.
Description	Display system-wide protocol-related statistics.
Options	none —Display system statistics for all the following protocols: <ul style="list-style-type: none">• arp—Address Resolution Protocol• bridge—IEEE 802.1 Bridging• clns—Connectionless Network Service• esis—End System-to-Intermediate System• ethoamcfm—Ethernet OAM protocol for connectivity fault management• ethoamlfm—Ethernet OAM protocol for link fault management• icmp—Internet Control Message Protocol• icmp6—Internet Control Message Protocol version 6• igmp—Internet Group Management Protocol• ip—Internet Protocol version 4• ip6—Internet Protocol version 6• mpls—Multiprotocol Label Switching• rdp—Reliable Datagram Protocol

- **tcp**—Transmission Control Protocol
- **tnp**—Trivial Network Protocol
- **ttp**—TNP Tunneling Protocol
- **tudp**—Trivial User Datagram Protocol
- **udp**—User Datagram Protocol
- **vpls**—Virtual Private LAN Service

all-chassis—(TX Matrix and TX Matrix Plus routers only) (Optional) Display system statistics for a protocol for all the routers in the chassis.

all-lcc—(TX Matrix and TX Matrix Plus routers only) (Optional) On a TX Matrix router, display system statistics for a protocol for all T640 routers (or line-card chassis) connected to the TX Matrix router. On a TX Matrix Plus router, display system statistics for a protocol for all routers (line-card chassis) connected to the TX Matrix Plus router

all-members—(EX4200 switches and MX Series routers only) (Optional) Display system statistics for a protocol for all members of the Virtual Chassis configuration.

lcc *number*—(TX Matrix and TX Matrix Plus routers only) (Optional) On a TX Matrix router, display system statistics for a protocol for a specific T640 router that is connected to the TX Matrix router. On a TX Matrix Plus router, display system statistics for a protocol for a specific router that is connected to the TX Matrix Plus router. Replace *number* with the following values depending on the LCC configuration:

- 0 through 3, when T640 routers are connected to a TX Matrix router in a routing matrix.
- 0 through 3, when T1600 routers are connected to a TX Matrix Plus router in a routing matrix.
- 0 through 7, when T1600 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.
- 0, 2, 4, or 6, when T4000 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.

local—(EX4200 switches and MX Series routers only) (Optional) Display system statistics for a protocol for the local Virtual Chassis member.

member *member-id*—(EX4200 switches and MX Series routers only) (Optional) Display system statistics for a protocol for 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.

scc—(TX Matrix routers only) (Optional) Display system statistics for a protocol for the TX Matrix router (or switch-card chassis).

sfc *number*—(TX Matrix Plus routers only) (Optional) Display system statistics for a protocol for the TX Matrix Plus router (or switch-fabric chassis). Replace *number* with 0.

Additional Information By default, when you issue the **show system statistics** 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 the TX Matrix router) or T1600 (in a routing matrix based on the 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 the TX Matrix router) or T1600 (in a routing matrix based on the TX Matrix Plus router) backup Routing Engines that are connected to it.

Required Privilege Level view

List of Sample Output [show system statistics on page 313](#)
[show system statistics \(EX Series Switches\) on page 320](#)
[show system statistics \(TX Matrix Router\) on page 329](#)
[show system statistics \(QFX Series\) on page 335](#)

Sample Output

```

show system statistics user@host> show system statistics
ip:
    3682087 total packets received
    0 bad header checksums
    0 with size smaller than minimum
    0 with data size < data length
    0 with header length < data size
    0 with data length < header length
    0 with incorrect version number
    0 packets destined to dead next hop
    0 fragments received
    0 fragments dropped (dup or out of space)
    0 fragments dropped (queue overflow)
    0 fragments dropped after timeout
    0 fragments dropped due to over limit
    0 packets reassembled ok
    3664774 packets for this host
    17316 packets for unknown/unsupported protocol
    0 packets forwarded
    0 packets not forwardable
    0 redirects sent
    6528 packets sent from this host
    0 packets sent with fabricated ip header
    0 output packets dropped due to no bufs
    0 output packets discarded due to no route
    0 output datagrams fragmented
    0 fragments created
    0 datagrams that can't be fragmented
    0 packets with bad options
    1123 packets with options handled without error
    0 strict source and record route options
    0 loose source and record route options
    0 record route options
    0 timestamp options
    0 timestamp and address options
    0 timestamp and prespecified address options
    0 option packets dropped due to rate limit
    1123 router alert options
    0 multicast packets dropped (no iflist)
    0 packets dropped (src and int don't match)
icmp:
    0 drops due to rate limit
    0 calls to icmp_error
    0 errors not generated because old message was icmp
Output histogram:
    echo reply: 75
    0 messages with bad code fields
    0 messages less than the minimum length
    0 messages with bad checksum
    0 messages with bad source address
    0 messages with bad length
    0 echo drops with broadcast or multicast destination address
    0 timestamp drops with broadcast or multicast destination address
Input histogram:
    echo: 75
    router advertisement: 130
    75 message responses generated
tcp:

```

```
3844 packets sent
    3618 data packets (1055596 bytes)
    0 data packets (0 bytes) retransmitted
    0 resends initiated by MTU discovery
    205 ack-only packets (148 packets delayed)
    0 URG only packets
    0 window probe packets
    0 window update packets
    1079 control packets
5815 packets received
    3377 acks (for 1055657 bytes)
    24 duplicate acks
    0 acks for unsent data
    2655 packets (15004 bytes) received in-sequence
    1 completely duplicate packet (0 bytes)
    0 old duplicate packets
    0 packets with some dup. data (0 bytes duped)
    0 out-of-order packets (0 bytes)
    0 packets (0 bytes) of data after window
    0 window probes
    7 window update packets
    0 packets received after close
    0 discarded for bad checksums
    0 discarded for bad header offset fields
    0 discarded because packet too short
1 connection request
32 connection accepts
0 bad connection attempts
0 listen queue overflows
33 connections established (including accepts)
30 connections closed (including 0 drops)
    27 connections updated cached RTT on close
    27 connections updated cached RTT variance on close
    0 connections updated cached ssthresh on close
0 embryonic connections dropped
3374 segments updated rtt (of 3220 attempts)
0 retransmit timeouts
    0 connections dropped by rexmit timeout
0 persist timeouts
    0 connections dropped by persist timeout
344 keepalive timeouts
    0 keepalive probes sent
    0 connections dropped by keepalive
1096 correct ACK header predictions
1314 correct data packet header predictions
32 syncache entries added
    0 retransmitted
    0 dupsyn
    0 dropped
    32 completed
    0 bucket overflow
    0 cache overflow
    0 reset
    0 stale
    0 aborted
    0 badack
    0 unreach
    0 zone failures
0 cookies sent
0 cookies received
0 ACKs sent in response to in-window but not exact RSTs
```

```

0 ACKs sent in response to in-window SYNs on established connections
0 rcv packets dropped by TCP due to bad address
0 out-of-sequence segment drops due to insufficient memory
1058 RST packets
0 ICMP packets ignored by TCP
0 send packets dropped by TCP due to auth errors
0 rcv packets dropped by TCP due to auth errors

udp:
3658884 datagrams received
0 with incomplete header
0 with bad data length field
0 with bad checksum
3657342 dropped due to no socket
3657342 broadcast/multicast datagrams dropped due to no socket
0 dropped due to full socket buffers
0 not for hashed pcb
4291311496 delivered
1551 datagrams output

ipsec:
0 inbound packets processed successfully
0 inbound packets violated process security policy
0 inbound packets with no SA available
0 invalid inbound packets
0 inbound packets failed due to insufficient memory
0 inbound packets failed getting SPI
0 inbound packets failed on AH replay check
0 inbound packets failed on ESP replay check
0 inbound AH packets considered authentic
0 inbound AH packets failed on authentication
0 inbound ESP packets considered authentic
0 inbound ESP packets failed on authentication
0 outbound packets processed successfully
0 outbound packets violated process security policy
0 outbound packets with no SA available
0 invalid outbound packets
0 outbound packets failed due to insufficient memory
0 outbound packets with no route

igmp:
17186 messages received
0 messages received with too few bytes
0 messages received with bad checksum
0 membership queries received
0 membership queries received with invalid field(s)
0 membership reports received
0 membership reports received with invalid field(s)
0 membership reports received for groups to which we belong
0 membership reports sent

arp:
44181302 datagrams received
2 ARP requests received
2028 ARP replies received
3156 resolution requests received
0 unrestricted proxy requests
0 received proxy requests
0 proxy requests not proxied
0 with bogus interface
787 with incorrect length
712 for non-IP protocol
0 with unsupported op code
0 with bad protocol address length
0 with bad hardware address length

```

```
0 with multicast source address
7611 with multicast target address
0 with my own hardware address
14241699 for an address not on the interface
0 with a broadcast source address
0 with source address duplicate to mine
29929250 which were not for me
0 packets discarded waiting for resolution
6 packets sent after waiting for resolution
17812 ARP requests sent
2 ARP replies sent
0 requests for memory denied
0 requests dropped on entry
0 requests dropped during retry

ip6:
0 total packets received
0 with size smaller than minimum
0 with data size < data length
0 with bad options
0 with incorrect version number
0 fragments received
0 fragments dropped (dup or out of space)
0 fragments dropped after timeout
0 fragments that exceeded limit
0 packets reassembled ok
0 packets for this host
0 packets forwarded
0 packets not forwardable
0 redirects sent
0 packets sent from this host
0 packets sent with fabricated ip header
0 output packets dropped due to no bufs, etc.
0 output packets discarded due to no route
0 output datagrams fragmented
0 fragments created
0 datagrams that can't be fragmented
0 packets that violated scope rules
0 multicast packets which we don't join
Mbuf statistics:
0 packets whose headers are not continuous
0 tunneling packets that can't find gif
0 packets discarded due to too many headers
0 failures of source address selection
0 forward cache hit
0 forward cache miss
0 packets destined to dead next hop
0 option packets dropped due to rate limit
0 packets dropped (src and int don't match)
0 packets dropped due to bad protocol

icmp6:
0 calls to icmp_error
0 errors not generated because old message was icmp error or so
0 errors not generated because rate limitation
0 messages with bad code fields
0 messages < minimum length
0 bad checksums
0 messages with bad length
Histogram of error messages to be generated:
    0 no route
    0 administratively prohibited
    0 beyond scope
```

```

0 address unreachable
0 port unreachable
0 packet too big
0 time exceed transit
0 time exceed reassembly
0 erroneous header field
0 unrecognized next header
0 unrecognized option
0 redirect
0 unknown
0 message responses generated
0 messages with too many ND options
ipsec6:
0 inbound packets processed successfully
0 inbound packets violated process security policy
0 inbound packets with no SA available
0 invalid inbound packets
0 inbound packets failed due to insufficient memory
0 inbound packets failed getting SPI
0 inbound packets failed on AH replay check
0 inbound packets failed on ESP replay check
0 inbound AH packets considered authentic
0 inbound AH packets failed on authentication
0 inbound ESP packets considered authentic
0 inbound ESP packets failed on authentication
0 outbound packets processed successfully
0 outbound packets violated process security policy
0 outbound packets with no SA available
0 invalid outbound packets
0 outbound packets failed due to insufficient memory
0 outbound packets with no route
c1nl:
0 total packets received
0 packets delivered
0 too small
0 bad header length
0 bad checksum
0 bad version
0 unknown or unsupported protocol
0 bogus sdl size
0 no free memory in socket buffer
0 send packets discarded
0 sbappend failure
0 mcopy failure
0 address fields were not reasonable
0 segment information forgotten
0 forwarded packets
0 total packets sent
0 output packets discarded
0 non-forwarded packets
0 packets fragmented
0 fragments sent
0 fragments discarded
0 fragments timed out
0 fragmentation prohibited
0 packets reconstructed
0 packets destined to dead nexthop
0 packets discarded due to no route
0 Error pdu rate drops
0 ER pdu generation failure
esis:

```

```
0 total pkts received
0 total packets consumed by protocol
0 pdus received with bad checksum
0 pdus received with bad version number
0 pdus received with bad type field
0 short pdus received
0 bogus sdl size
0 bad header length
0 unknown or unsupported protocol
0 no free memory in socket buffer
0 send packets discarded
0 sbappend failure
0 mcopy failure
0 ISO family not configured
tnp:
146776365 unicast packets received
0 broadcast packets received
0 fragmented packets received
0 hello packets dropped
0 fragments dropped
0 fragment reassembly queue flushes
0 hello packets received
0 control packets received
49681642 rdp packets received
337175 udp packets received
96757548 tunnel packets received
0 input packets discarded with no protocol
98397591 unicast packets sent
0 broadcast packets sent
0 fragmented packets sent
0 hello packets dropped
0 fragments dropped
0 hello packets sent
0 control packets sent
49681642 rdp packets sent
337175 udp packets sent
48378774 tunnel packets sent
0 packets sent with unknown protocol
rdp:
49681642 input packets
0 discards for bad checksum
0 discards bad sequence number
0 refused connections
2031964 acks received
0 dropped due to full socket buffers
49692 retransmits
49681642 output packets
24815968 acks sent
28 connects
0 closes
22783990 keepalives received
22783990 keepalives sent
tudp:
337175 datagrams received
0 with incomplete header
0 with bad data length field
0 with bad checksum
0 dropped due to no socket
0 broadcast/multicast datagrams dropped due to no socket
0 dropped due to full socket buffers
337175 delivered
```



```

337175 datagrams output
ttp:
398749 packets sent
0 packets sent while unconnected
0 packets sent while interface down
0 packets sent couldn't get buffer
0 packets sent couldn't find neighbor
44696687 L2 packets received
0 unknown L3 packets received
3682087 IPv4 L3 packets received
0 MPLS L3 packets received
0 MPLS->IPv4 L3 packets received
0 IPv4->MPLS L3 packets received
0 IPv6 L3 packets received
0 ARP L3 packets received
0 CLNP L3 packets received
0 TNP L3 packets received
0 NULL L3 packets received
0 cyclotron cycle L3 packets received
0 cyclotron send L3 packets received
0 packets received while unconnected
0 packets received from unknown ifl
0 input packets couldn't get buffer
0 input packets with bad type
0 input packets with discard type
0 Input packets with too many tlvs
0 Input packets with bad tlv header
70633 Input packets with bad tlv type
68877 Input packets dropped based on tlv result
0 input packets for which rt lookup is bypassed
mpls:
0 total mpls packets received
0 packets forwarded
0 packets dropped
0 with header too small
0 after tagging, can't fit link MTU
0 with IPv4 explicit NULL tag
0 with IPv4 explicit NULL cksum errors
0 with router alert tag
0 lsp ping packets (ttl-expired/router alert)
0 with ttl expired
0 with tag encoding error
0 packets discarded, no route
vpls:
0 total packets received
0 with size smaller than minimum
0 with incorrect version number
0 packets for this host
0 packets with no logical interface
0 packets with no family
0 packets with no route table
0 packets with no auxiliary table
0 packets with no corefacing entry
0 packets with no CE-facing entry
0 mac route learning requests
0 mac routes learnt
0 requests to learn an existing route
0 learning requests while learning disabled on interface
0 learning requests over capacity
0 mac routes moved
0 requests to move static route

```

```

0 mac route aging requests
0 mac routes aged
0 bogus address in aging requests
0 requests to age static route
0 requests to re-ageout aged route
0 requests involving multiple peer FEs
0 aging acks from PFE
0 aging non-acks from PFE
0 aging requests timed out waiting on FEs
0 aging requests over max-rate
0 errors finding peer FEs

```

show system statistics (EX Series Switches)

```

user@host> show system statistics
Tcp:

```

```

571779 packets sent
    21517 data packets (1797102 bytes)
    2 data packets retransmitted (20 bytes)
    0 resends initiated by MTU discovery
    3708 ack only packets (531 packets delayed)
    0 URG only packets
    1 window probe packets
    1 window update packets
    1093063 control packets
1132541 packets received
    20961 acks(for 1796102 bytes)
    5861 duplicate acks
    0 acks for unsent data
    19556 packets received in-sequence(232079 bytes)
    3018 completely duplicate packets(0 bytes)
    0 old duplicate packets
    4 packets with some duplicate data(4 bytes duped)
    2 out-of-order packets(2 bytes)
    0 packets of data after window(0 bytes)
    0 window probes
    39 window update packets
    0 packets received after close
    0 discarded for bad checksums
    0 discarded for bad header offset fields
    0 discarded because packet too short
546519 connection requests
78 connection accepts
0 bad connection attempts
0 listen queue overflows
100 connections established (including accepts)
546596 connections closed (including 6 drops)
    47 connections updated cached RTT on close
    47 connections updated cached RTT variance on close
    0 connections updated cached ssthresh on close
546497 embryonic connections dropped
20453 segments updated rtt(of 566914 attempts)
2 retransmit timeouts
    0 connections dropped by retransmit timeout
0 persist timeouts
    0 connections dropped by persist timeout
3028 keepalive timeouts
    3027 keepalive probes sent
    1 connections dropped by keepalive
7515 correct ACK header predictions
12258 correct data packet header predictions
78 syncache entries added
    0 retransmitted

```

```

0 dupsyn
4 dropped
78 completed
0 bucket overflow
0 cache overflow
0 reset
0 stale
0 aborted
0 badack
0 unreach
0 zone failures
0 cookies sent
0 cookies received
1 SACK recovery episodes
1 segment retransmits in SACK recovery episodes
1 byte retransmits in SACK recovery episodes
71 SACK options (SACK blocks) received
1 SACK options (SACK blocks) sent
0 SACK scoreboard overflow
0 ACKs sent in response to in-window but not exact RSTs
0 ACKs sent in response to in-window SYNs on established connections
0 rcv packets dropped by TCP due to bad address
0 out-of-sequence segment drops due to insufficient memory
546544 RST packets
0 ICMP packets ignored by TCP
0 send packets dropped by TCP due to auth errors
0 rcv packets dropped by TCP due to auth errors
0 outgoing segments dropped due to policing

udp:
147 datagrams received
0 with incomplete header
0 with bad data length field
0 with bad checksum
9 dropped due to no socket
0 broadcast/multicast datagrams dropped due to no socket
0 dropped due to full socket buffers
0 not for hashed pcb
138 delivered
0 datagrams output

ip:
73704 total packets received
0 bad header checksums
0 with size smaller than minimum
0 with data size < data length
0 with header length < data size
0 with data length < header length
0 with incorrect version number
0 packets destined to dead next hop
0 fragments received
0 fragments dropped (dup or out of space)
0 fragments dropped (queue overflow)
0 fragments dropped after timeout
0 fragments dropped due to over limit
0 packets reassembled ok
1133057 packets for this host
0 packets for unknown/unsupported protocol
40146 packets forwarded
0 packets not forwardable
40146 redirects sent
1121700 packets sent from this host
0 packets sent with fabricated ip header

```

```

0 output packets dropped due to no bufs
0 output packets discarded due to no route
0 output datagrams fragmented
0 fragments created
0 datagrams that can't be fragmented
0 packets with bad options
0 packets with options handled without error
0 strict source and record route options
0 loose source and record route options
0 record route options
0 timestamp options
0 timestamp and address options
0 timestamp and prespecified address options
0 option packets dropped due to rate limit
0 router alert options
0 multicast packets dropped (no iflist)
0 packets dropped (src and int don't match)
0 transit re packets dropped on mgmt i/f
0 packets used first nexthop in ecmp unilist
0 incoming ttpoip packets received
0 incoming ttpoip packets dropped
0 outgoing TTPoIP packets sent
0 outgoing TTPoIP packets dropped

icmp:
0 drops due to rate limit
9 calls to icmp_error
0 errors not generated because old message was icmp
Output histogram:
    295 echo reply
    9 destination unreachable
0 messages with bad code fields
0 messages less than the minimum length
0 messages with bad checksum
0 messages with bad source address
0 messages with bad length
0 echo drops with broadcast or multicast destination address
0 timestamp drops with broadcast or multicast destination address
Input histogram:
    295 echo
295 message responses generated

igmp:
0 messages received
0 messages received with too few bytes
0 messages received with bad checksum
0 membership queries received
0 membership queries received with invalid fields
0 membership reports received
0 membership reports received with invalid fields
0 membership reports received for groups to which we belong
0 Membership reports sent

raw_if:
0 RAW packets transmitted
0 PPPOE packets transmitted
0 ISDN packets transmitted
0 DIALER packets transmitted
0 PPP packets transmitted to pppd
0 PPP packets transmitted to jppd
0 IGMPv2 packets transmitted
13 output drops due to tx error
0 MPU packets transmitted
0 PPPOE packets received

```

```

0 ISDN packets received
0 DIALER packets received
0 PPP packets received from pppd
0 MPU packets received
0 PPP packets received from jppd
0 IGMPv2 packets received
0 Input drops due to bogus protocol
0 input drops due to no mbufs available
0 input drops due to no space in socket
0 input drops due to no socket

arp:
186413 datagrams received
88 ARP requests received
88 ARP replies received
0 resolution request received
0 unrestricted proxy requests
0 restricted proxy requests
0 received proxy requests
0 proxy requests not proxied
0 restricted proxy requests not proxied
0 datagrams with bogus interface
0 datagrams with incorrect length
0 datagrams for non-IP protocol
0 datagrams with unsupported op code
0 datagrams with bad protocol address length
0 datagrams with bad hardware address length
0 datagrams with multicast source address
0 datagrams with multicast source address
0 datagrams with my own hardware address
164 datagrams for an address not on the interface
0 datagrams with a broadcast source address
0 datagrams with source address duplicate to mine
186065 datagrams which were not for me
0 packets discarded waiting for resolution
0 packets sent after waiting for resolution
50 ARP requests sent
88 ARP replies sent
0 requests for memory denied
0 requests dropped on entry
0 requests dropped during retry
0 requests dropped due to interface deletion
0 requests on unnumbered interfaces
0 new requests on unnumbered interfaces
0 replies for from unnumbered interfaces
0 requests on unnumbered interface with non-subnetted donor
0 replies from unnumbered interface with non-subnetted donor

ip6:
0 total packets received
0 packets with size smaller than minimum
0 packets with data size < data length
0 packets with bad options
0 packets with incorrect version number
0 fragments received
0 fragments dropped (dup or out of space)
0 fragments dropped after timeout
0 fragments that exceeded limit
0 packets reassembled ok
0 packets for this host
0 packets forwarded
0 packets not forwardable
0 redirects sent

```

```
0 packets sent from this host
0 packets sent with fabricated ip header
0 output packets dropped due to no bufs, etc.
0 output datagrams fragmented
0 fragments created
0 datagrams that can't be fragmented
0 packets that violated scope rules
0 multicast packets which we don't join
0 packets whose headers are not continuous
0 tunneling packets that can't find gif
0 packets discarded due to too many headers
0 failures of source address selection
0 forward cache hit
0 forward cache miss
0 Packets destined to dead next hop
0 option packets dropped due to rate limit
0 Packets dropped (src and int don't match)
0 packets dropped due to bad protocol
0 transit re packet(null) dropped on mgmt i/f

icmp6:
0 Calls to icmp_error
0 Errors not generated because old message was icmp error
0 Errors not generated because rate limitation
0 Messages with bad code fields
0 Messages < minimum length
0 Bad checksums
0 Messages with bad length
    0 No route
    0 Administratively prohibited
    0 Beyond scope
    0 Address unreachable
    0 Port unreachable
    0 packet too big
    0 Time exceed transit
    0 Time exceed reassembly
    0 Erroneous header field
    0 Unrecognized next header
    0 Unrecognized option
    0 redirect
    0 Unknown
0 Message responses generated
0 Messages with too many ND options

pfkey:
0 Requests sent from userland
0 Bytes sent from userland
histogram by message type:
    0 reserved
    0 dump
0 Messages with invalid length field
0 Messages with invalid version field
0 Messages with invalid message type field
0 Messages too short
0 Messages with memory allocation failure
0 Messages with duplicate extension
0 Messages with invalid extension type
0 Messages with invalid sa type
0 Messages with invalid address extension
0 Requests sent to userland
0 Bytes sent to userland
histogram by message type:
    0 reserved
```

```

0 dump
0 Messages toward single socket
0 Messages toward all sockets
0 Messages toward registered sockets
0 Messages with memory allocation failure
c1n1:
0 Total packets received
0 Packets delivered
0 Too small packets
0 Packets with bad header length
0 Packets with bad checksum
0 Bad version packets
0 Unknown or unsupported protocol packets
0 Packets with bogus sdl size
0 No free memory in socket buffer
0 Send packets discarded
0 Sbappend failure
0 Mcopy failure
0 Address fields were not reasonable
0 Segment information forgotten
0 Forwarded packets
0 Total packets sent
0 Output packets discarded
0 Non-forwarded packets
0 Packets fragmented
0 Fragments sent
0 Fragments discarded
0 Fragments timed out
0 Fragmentation prohibited
0 Packets reconstructed
0 Packets destined to dead nexthop
0 Packets discarded due to no route
0 Error pdu rate drops
0 ER pdu generation failure
esis:
0 Total pkts received
0 Total packets consumed by protocol
0 Pdus received with bad checksum
0 Pdus received with bad version number
0 Pdus received with bad type field
0 Short pdus received
0 Pdus with bogus sdl size
0 Pdus with bad header length
0 Pdus with unknown or unsupported protocol
0 No free memory in socket buffer
0 Send packets discarded
0 Sbappend failure
0 Mcopy failure
0 ISO family not configured
tnp:
0 Unicast packets received
0 Broadcast packets received
0 Fragmented packets received
0 Hello packets dropped
0 Fragments dropped
0 Fragment reassembly queue flushes
0 Packets with tnp src address collision received
0 Hello packets received
0 Control packets received
0 Rdp packets received
0 Udp packets received

```

```
0 Tunnel packets received
0 Input packets discarded with no protocol
0 Packets of version unspecified received
0 Packets of version 1 received
0 Packets of version 2 received
0 Packets of version 3 received
0 Unicast packets sent
0 Broadcast packets sent
0 Fragmented packets sent
0 Hello packets dropped
0 Fragments dropped
0 Hello packets sent
0 Control packets sent
0 Rdp packets sent
0 Udp packets sent
0 Tunnel packets sent
0 Packets sent with unknown protocol
0 Packets of version unspecified sent
0 Packets of version 1 sent
0 Packets of version 2 sent
0 Packets of version 3 sent
rdp:
0 Input packets
0 Packets discarded for bad checksum
0 Packets discarded due to bad sequence number
0 Refused connections
0 Acks received
0 Packets dropped due to full socket buffers
0 Retransmits
0 Output packets
0 Acks sent
0 Connects
0 Closes
0 Keepalives received
0 Keepalives sent
tudp:
67 Datagrams received
0 Datagrams with incomplete header
0 Datagrams with bad data length field
0 Datagrams with bad checksum
0 Datagrams dropped due to no socket
0 Broadcast/multicast datagrams dropped due to no socket
0 Datagrams dropped due to full socket buffers
67 Delivered
68 Datagrams output
ttp:
0 Packets sent
0 Packets sent while unconnected
0 Packets sent while interface down
0 Packets sent couldn't get buffer
0 Packets sent couldn't find neighbor
0 L2 packets received
0 Unknown L3 packets received
0 IPv4 L3 packets received
0 MPLS L3 packets received
0 MPLS->IPv4 L3 packets received
0 IPv4->MPLS L3 packets received
0 IPv6 L3 packets received
0 ARP L3 packets received
0 CLNP L3 packets received
0 TNP L3 packets received
```



```

0 NULL L3 packets received
0 Cyclotron cycle L3 packets received
0 Cyclotron send L3 packets received
0 Packets received while unconnected
0 Packets received from unknown ifl
0 Input packets couldn't get buffer
0 Input packets with bad type
0 Input packets with discard type
0 Input packets with too many tlvs
0 Input packets with bad tlv header
70633 Input packets with bad tlv type
68877 Input packets dropped based on tlv result
0 Input packets for which rt lookup is bypassed

mpls:
0 Total MPLS packets received
0 Packets forwarded
0 Packets dropped
0 Packets with header too small
0 After tagging, packets can't fit link MTU
0 Packets with IPv4 explicit NULL tag
0 Packets with IPv4 explicit NULL cksum errors
0 Packets with router alert tag
0 LSP ping packets (ttl-expired/router alert)
0 Packets with ttl expired
0 Packets with tag encoding error
0 Packets discarded due to no route
0 Packets used first nexthop in ecmp unilist

vpls:
0 Total packets received
0 Packets with size smaller than minimum
0 Packets with incorrect version number
0 Packets for this host
0 Packets with no logical interface
0 Packets with no family
0 Packets with no route table
0 Packets with no auxiliary table
0 Packets with no corefacing entry
0 packets with no CE-facing entry
0 MAC route learning requests
0 MAC routes learnt
0 Requests to learn an existing route
0 Learning requests while learning disabled on interface
0 Learning requests over capacity
0 MAC routes moved
0 Requests to move static route
0 MAC route aging requests
0 MAC routes aged
0 Bogus address in aging requests
0 Requests to age static route
0 Requests to re-ageout aged route
0 Requests involving multiple peer FEs
0 Aging acks from PFE
0 Aging non-acks from PFE
0 Aging requests timed out waiting on FEs
0 Aging requests over max-rate
0 Errors finding peer FEs
0 Unsupported platform
0 Packets dropped due to no l3 route table
0 Packets dropped due to no local ifl
0 Packets punted
0 Packets dropped due to no socket

```

bridge:

Input:

- 0 packets received
- 0 packets forwarded
- 0 packets failed to forward
- 0 packets dropped
- 0 packets with vmember lookup failures
- 0 packets with vlan lookup failures
- 0 packets with stp state lookup failures
- 0 packets dropped due to stp blocked/listening
- 0 packets dropped due to stp learning
- 0 packets with src MAC learning failures
- 0 packets with input control processing failures

Forward:

- 0 packets sent successfully
- 0 packets with send failures
- 0 packets forwarded to l3 interface
- 0 packets with l3 send failures
- 0 packets discarded
- 0 packets with l2ifl store failures
- 0 packets with ifl mismatch failures
- 0 packets with packet duplication failures
- 0 packets with tag lookup failures
- 0 packets with no route for DMAC
- 0 packets with no route table
- 0 packets with no nexthop
- 0 packets with dead nexthop
- 0 packets with eof reached error

Learning:

- 0 MACs learned
- 0 packets sent to l3 interface
- 0 packets with l3 send failures
- 0 packets hit holdq while learning
- 0 MAC moves
- 0 packets discarded
- 0 packets with no route for SMAC
- 0 packets with no nexthop
- 0 packets with dead nexthop
- 0 packets dropped due to no resolve route
- 0 packets with l3 ifd lookup failures
- 0 packets with l3 ifl lookup failures
- 0 packets with l3 invalid rnh
- 0 packets with no route for SMAC in clone learning
- 0 packets with no nexthop in clone learning
- 0 packets with dead nexthop in clone learning
- 0 packets dropped due to no resolve nh in clone learning

Output:

- 0 packets forwarded
- 0 packets failed to forward
- 0 packets with vmember lookup failures
- 0 packets with vlan lookup failures
- 0 packets with input control processing failures

Send:

- 0 packets sent successfully
- 0 packets with send failures
- 0 packets dropped due to interface down
- 0 packets with dev output failures
- 0 blocked ifl discards
- 0 packets with tag lookup failures
- 0 packets with stp state lookup failures
- 0 packets with tag insertion failures

```

0 packets with tag removal failures
Flood:
0 packets flooded
0 flood failures
IGMP:
0 packets sent successfully
0 packets with send failures
0 packets forwarded
0 packets failed to forward
0 packets with mpull failures
0 packets with vmember lookup failures
0 packets with vlan lookup failures
0 packets with ifl lookup failures
0 packets with tag lookup failures
Misc:
0 packets with size smaller than minimum
0 packets with double tags
0 packets with no ifl
0 packets with no family
0 packets with no route table

```

**show system statistics
(TX Matrix Router)**

```

user@host> show system statistics
sfc0-re0:

```

```

-----
Tcp:
361694 packets sent
    326507 data packets (103237236 bytes)
    2343 data packets retransmitted (2673324 bytes)
    0 resends initiated by MTU discovery
    33857 ack only packets (31613 packets delayed)
    0 URG only packets
    14 window probe packets
    387 window update packets
    1108 control packets
345879 packets received
    298207 acks(for 103141728 bytes)
    438 duplicate acks
    0 acks for unsent data
    204578 packets received in-sequence(13820995 bytes)
    6 completely duplicate packets(18 bytes)
    0 old duplicate packets
    0 packets with some duplicate data(0 bytes duped)
    0 out-of-order packets(0 bytes)
    0 packets of data after window(0 bytes)
    0 window probes
    899 window update packets
    166 packets received after close
    0 discarded for bad checksums
    0 discarded for bad header offset fields
    0 discarded because packet too short
406 connection requests
233 connection accepts
0 bad connection attempts
0 listen queue overflows
616 connections established (including accepts)
911 connections closed (including 41 drops)
    346 connections updated cached RTT on close
    346 connections updated cached RTT variance on close
    200 connections updated cached ssthresh on close
23 embryonic connections dropped
298155 segments updated rtt(of 287216 attempts)

```

```
1163 retransmit timeouts
    27 connections dropped by retransmit timeout
0 persist timeouts
    0 connections dropped by persist timeout
5 keepalive timeouts
    5 keepalive probes sent
    0 connections dropped by keepalive
69922 correct ACK header predictions
34993 correct data packet header predictions
233 syncache entries added
    0 retransmitted
    0 dupsyn
    0 dropped
    233 completed
    0 bucket overflow
    0 cache overflow
    0 reset
    0 stale
    0 aborted
    0 badack
    0 unreach
    0 zone failures
0 cookies sent
0 cookies received
23 SACK recovery episodes
68 segment retransmits in SACK recovery episodes
71542 byte retransmits in SACK recovery episodes
158 SACK options (SACK blocks) received
0 SACK options (SACK blocks) sent
0 SACK scoreboard overflow
0 ACKs sent in response to in-window but not exact RSTs
0 ACKs sent in response to in-window SYNs on established connections
0 rcv packets dropped by TCP due to bad address
0 out-of-sequence segment drops due to insufficient memory
259 RST packets
0 ICMP packets ignored by TCP
0 send packets dropped by TCP due to auth errors
0 rcv packets dropped by TCP due to auth errors
0 outgoing segments dropped due to policing
```

1cc0-re0:

Tcp:

```
346 packets sent
    222 data packets (22894 bytes)
    0 data packets retransmitted (0 bytes)
    0 resends initiated by MTU discovery
    80 ack only packets (12 packets delayed)
    0 URG only packets
    0 window probe packets
    5 window update packets
    42 control packets
358 packets received
    268 acks(for 22939 bytes)
    9 duplicate acks
    0 acks for unsent data
    203 packets received in-sequence(33820 bytes)
    0 completely duplicate packets(0 bytes)
    0 old duplicate packets
    0 packets with some duplicate data(0 bytes duped)
    0 out-of-order packets(0 bytes)
```

```

        0 packets of data after window(0 bytes)
        0 window probes
        6 window update packets
        0 packets received after close
        0 discarded for bad checksums
        0 discarded for bad header offset fields
        0 discarded because packet too short
13 connection requests
18 connection accepts
0 bad connection attempts
0 listen queue overflows
31 connections established (including accepts)
35 connections closed (including 2 drops)
    3 connections updated cached RTT on close
    3 connections updated cached RTT variance on close
    0 connections updated cached ssthresh on close
0 embryonic connections dropped
268 segments updated rtt(of 247 attempts)
0 retransmit timeouts
    0 connections dropped by retransmit timeout
0 persist timeouts
    0 connections dropped by persist timeout
0 keepalive timeouts
    0 keepalive probes sent
    0 connections dropped by keepalive
0 correct ACK header predictions
42 correct data packet header predictions
18 syncache entries added
    0 retransmitted
    0 dupsyn
    0 dropped
    18 completed
    0 bucket overflow
    0 cache overflow
    0 reset
    0 stale
    0 aborted
    0 badack
    0 unreach
    0 zone failures
0 cookies sent
0 cookies received
0 SACK recovery episodes
0 segment retransmits in SACK recovery episodes
0 byte retransmits in SACK recovery episodes
0 SACK options (SACK blocks) received
0 SACK options (SACK blocks) sent
0 SACK scoreboard overflow
0 ACKs sent in response to in-window but not exact RSTs
0 ACKs sent in response to in-window SYNs on established connections
0 rcv packets dropped by TCP due to bad address
0 out-of-sequence segment drops due to insufficient memory
5 RST packets
0 ICMP packets ignored by TCP
0 send packets dropped by TCP due to auth errors
0 rcv packets dropped by TCP due to auth errors
0 outgoing segments dropped due to policing

```

lcc1-re0:

 Tcp:

```
348 packets sent
    223 data packets (22895 bytes)
    0 data packets retransmitted (0 bytes)
    0 resends initiated by MTU discovery
    81 ack only packets (13 packets delayed)
    0 URG only packets
    0 window probe packets
    5 window update packets
    42 control packets
360 packets received
    269 acks(for 22940 bytes)
    9 duplicate acks
    0 acks for unsent data
    203 packets received in-sequence(33820 bytes)
    0 completely duplicate packets(0 bytes)
    0 old duplicate packets
    0 packets with some duplicate data(0 bytes duped)
    0 out-of-order packets(0 bytes)
    0 packets of data after window(0 bytes)
    0 window probes
    6 window update packets
    0 packets received after close
    0 discarded for bad checksums
    0 discarded for bad header offset fields
    0 discarded because packet too short
13 connection requests
18 connection accepts
0 bad connection attempts
0 listen queue overflows
31 connections established (including accepts)
36 connections closed (including 2 drops)
    3 connections updated cached RTT on close
    3 connections updated cached RTT variance on close
    0 connections updated cached ssthresh on close
0 embryonic connections dropped
269 segments updated rtt(of 248 attempts)
0 retransmit timeouts
    0 connections dropped by retransmit timeout
0 persist timeouts
    0 connections dropped by persist timeout
0 keepalive timeouts
    0 keepalive probes sent
    0 connections dropped by keepalive
0 correct ACK header predictions
43 correct data packet header predictions
18 syncache entries added
    0 retransmitted
    0 dupsyn
    0 dropped
    18 completed
    0 bucket overflow
    0 cache overflow
    0 reset
    0 stale
    0 aborted
    0 badack
    0 unreach
    0 zone failures
0 cookies sent
0 cookies received
0 SACK recovery episodes
```

```

0 segment retransmits in SACK recovery episodes
0 byte retransmits in SACK recovery episodes
0 SACK options (SACK blocks) received
0 SACK options (SACK blocks) sent
0 SACK scoreboard overflow
0 ACKs sent in response to in-window but not exact RSTs
0 ACKs sent in response to in-window SYNs on established connections
0 rcv packets dropped by TCP due to bad address
0 out-of-sequence segment drops due to insufficient memory
5 RST packets
0 ICMP packets ignored by TCP
0 send packets dropped by TCP due to auth errors
0 rcv packets dropped by TCP due to auth errors
0 outgoing segments dropped due to policing

```

lcc2-re0:

Tcp:

```

405 packets sent
    271 data packets (23926 bytes)
    0 data packets retransmitted (0 bytes)
    0 resends initiated by MTU discovery
    86 ack only packets (13 packets delayed)
    0 URG only packets
    0 window probe packets
    5 window update packets
    46 control packets
418 packets received
    321 acks(for 23975 bytes)
    9 duplicate acks
    0 acks for unsent data
    234 packets received in-sequence(34403 bytes)
    0 completely duplicate packets(0 bytes)
    0 old duplicate packets
    0 packets with some duplicate data(0 bytes duped)
    0 out-of-order packets(0 bytes)
    0 packets of data after window(0 bytes)
    0 window probes
    7 window update packets
    0 packets received after close
    0 discarded for bad checksums
    0 discarded for bad header offset fields
    0 discarded because packet too short
15 connection requests
19 connection accepts
0 bad connection attempts
0 listen queue overflows
34 connections established (including accepts)
39 connections closed (including 2 drops)
    4 connections updated cached RTT on close
    4 connections updated cached RTT variance on close
    0 connections updated cached ssthresh on close
0 embryonic connections dropped
321 segments updated rtt(of 299 attempts)
0 retransmit timeouts
    0 connections dropped by retransmit timeout
0 persist timeouts
    0 connections dropped by persist timeout
0 keepalive timeouts
    0 keepalive probes sent
    0 connections dropped by keepalive

```

```
0 correct ACK header predictions
48 correct data packet header predictions
19 syncache entries added
    0 retransmitted
    0 dupsyn
    0 dropped
    19 completed
    0 bucket overflow
    0 cache overflow
    0 reset
    0 stale
    0 aborted
    0 badack
    0 unreach
    0 zone failures
0 cookies sent
0 cookies received
0 SACK recovery episodes
0 segment retransmits in SACK recovery episodes
0 byte retransmits in SACK recovery episodes
0 SACK options (SACK blocks) received
0 SACK options (SACK blocks) sent
0 SACK scoreboard overflow
0 ACKs sent in response to in-window but not exact RSTs
0 ACKs sent in response to in-window SYNs on established connections
0 rcv packets dropped by TCP due to bad address
0 out-of-sequence segment drops due to insufficient memory
5 RST packets
0 ICMP packets ignored by TCP
0 send packets dropped by TCP due to auth errors
0 rcv packets dropped by TCP due to auth errors
0 outgoing segments dropped due to policing
```

lcc3-re0:

Tcp:

```
346 packets sent
    221 data packets (22895 bytes)
    0 data packets retransmitted (0 bytes)
    0 resends initiated by MTU discovery
    81 ack only packets (13 packets delayed)
    0 URG only packets
    0 window probe packets
    5 window update packets
    42 control packets
360 packets received
    267 acks(for 22940 bytes)
    9 duplicate acks
    0 acks for unsent data
    203 packets received in-sequence(33820 bytes)
    0 completely duplicate packets(0 bytes)
    0 old duplicate packets
    0 packets with some duplicate data(0 bytes duped)
    0 out-of-order packets(0 bytes)
    0 packets of data after window(0 bytes)
    0 window probes
    6 window update packets
    0 packets received after close
    0 discarded for bad checksums
    0 discarded for bad header offset fields
    0 discarded because packet too short
```



```

13 connection requests
18 connection accepts
0 bad connection attempts
0 listen queue overflows
31 connections established (including accepts)
35 connections closed (including 2 drops)
    3 connections updated cached RTT on close
    3 connections updated cached RTT variance on close
    0 connections updated cached ssthresh on close
0 embryonic connections dropped
267 segments updated rtt(of 246 attempts)
0 retransmit timeouts
    0 connections dropped by retransmit timeout
0 persist timeouts
    0 connections dropped by persist timeout
0 keepalive timeouts
    0 keepalive probes sent
    0 connections dropped by keepalive
0 correct ACK header predictions
43 correct data packet header predictions
18 syncache entries added
    0 retransmitted
    0 dupsyn
    0 dropped
    18 completed
    0 bucket overflow
    0 cache overflow
    0 reset
    0 stale
    0 aborted
    0 badack
    0 unreach
    0 zone failures
0 cookies sent
0 cookies received
0 SACK recovery episodes
0 segment retransmits in SACK recovery episodes
0 byte retransmits in SACK recovery episodes
0 SACK options (SACK blocks) received
0 SACK options (SACK blocks) sent
0 SACK scoreboard overflow
0 ACKs sent in response to in-window but not exact RSTs
0 ACKs sent in response to in-window SYNs on established connections
0 rcv packets dropped by TCP due to bad address
0 out-of-sequence segment drops due to insufficient memory
5 RST packets
0 ICMP packets ignored by TCP
0 send packets dropped by TCP due to auth errors
0 rcv packets dropped by TCP due to auth errors
0 outgoing segments dropped due to policing

```

show system statistics (QFX Series)

```

user@switch> show system statistics
Tcp:
571779 packets sent
21517 data packets (1797102 bytes)
2 data packets retransmitted (20 bytes)
0 resends initiated by MTU discovery
3708 ack only packets (531 packets delayed)
0 URG only packets
1 window probe packets
1 window update packets

```

```
1093063 control packets
1132541 packets received
20961 acks(for 1796102 bytes)
5861 duplicate acks
0 acks for unsent data
19556 packets received in-sequence(232079 bytes)
3018 completely duplicate packets(0 bytes)
0 old duplicate packets
4 packets with some duplicate data(4 bytes duped)
2 out-of-order packets(2 bytes)
0 packets of data after window(0 bytes)
0 window probes
39 window update packets
0 packets received after close
0 discarded for bad checksums
0 discarded for bad header offset fields
0 discarded because packet too short
546519 connection requests
78 connection accepts
0 bad connection attempts
0 listen queue overflows
100 connections established (including accepts)
546596 connections closed (including 6 drops)
47 connections updated cached RTT on close
47 connections updated cached RTT variance on close
0 connections updated cached ssthresh on close
546497 embryonic connections dropped
20453 segments updated rtt(of 566914 attempts)
2 retransmit timeouts
0 connections dropped by retransmit timeout
0 persist timeouts
0 connections dropped by persist timeout
3028 keepalive timeouts
3027 keepalive probes sent
1 connections dropped by keepalive
7515 correct ACK header predictions
12258 correct data packet header predictions
78 syncache entries added
0 retransmitted
0 dupsyn
4 dropped
78 completed
0 bucket overflow
0 cache overflow
0 reset
0 stale
0 aborted
0 badack
0 unreach
0 zone failures
0 cookies sent
0 cookies received
1 SACK recovery episodes
1 segment retransmits in SACK recovery episodes
1 byte retransmits in SACK recovery episodes
71 SACK options (SACK blocks) received
1 SACK options (SACK blocks) sent
0 SACK scoreboard overflow
0 ACKs sent in response to in-window but not exact RSTs
0 ACKs sent in response to in-window SYNs on established connections
0 rcv packets dropped by TCP due to bad address
```

```
0 out-of-sequence segment drops due to insufficient memory
546544 RST packets
0 ICMP packets ignored by TCP
0 send packets dropped by TCP due to auth errors
0 rcv packets dropped by TCP due to auth errors
0 outgoing segments dropped due to policing
udp:
147 datagrams received
0 with incomplete header
0 with bad data length field
0 with bad checksum
9 dropped due to no socket
0 broadcast/multicast datagrams dropped due to no socket
0 dropped due to full socket buffers
0 not for hashed pcb
138 delivered
0 datagrams output
ip:
73704 total packets received
0 bad header checksums
0 with size smaller than minimum
0 with data size < data length
0 with header length < data size
0 with data length < header length
0 with incorrect version number
0 packets destined to dead next hop
0 fragments received
0 fragments dropped (dup or out of space)
0 fragments dropped (queue overflow)
0 fragments dropped after timeout
0 fragments dropped due to over limit
0 packets reassembled ok
1133057 packets for this host
0 packets for unknown/unsupported protocol
40146 packets forwarded
0 packets not forwardable
40146 redirects sent
1121700 packets sent from this host
0 packets sent with fabricated ip header
0 output packets dropped due to no bufs
0 output packets discarded due to no route
0 output datagrams fragmented
0 fragments created
0 datagrams that can't be fragmented
0 packets with bad options
0 packets with options handled without error
0 strict source and record route options
0 loose source and record route options
0 record route options
0 timestamp options
0 timestamp and address options
0 timestamp and prespecified address options
0 option packets dropped due to rate limit
0 router alert options
0 multicast packets dropped (no iflist)
0 packets dropped (src and int don't match)
0 transit re packets dropped on mgmt i/f
0 packets used first nexthop in ecmp unilist
0 incoming ttpoip packets received
0 incoming ttpoip packets dropped
0 outgoing TTPoIP packets sent
```

```
0 outgoing TTPoIP packets dropped
icmp:
0 drops due to rate limit
9 calls to icmp_error
0 errors not generated because old message was icmp
Output histogram:
295 echo reply
9 destination unreachable
0 messages with bad code fields
0 messages less than the minimum length
0 messages with bad checksum
0 messages with bad source address
0 messages with bad length
0 echo drops with broadcast or multicast destination address
0 timestamp drops with broadcast or multicast destination address
Input histogram:
295 echo
295 message responses generated
igmp:
0 messages received
0 messages received with too few bytes
0 messages received with bad checksum
0 membership queries received
0 membership queries received with invalid fields
0 membership reports received
0 membership reports received with invalid fields
0 membership reports received for groups to which we belong
0 Membership reports sent
raw_if:
0 RAW packets transmitted
0 PPPOE packets transmitted
0 ISDN packets transmitted
0 DIALER packets transmitted
0 PPP packets transmitted to pppd
0 PPP packets transmitted to jppd
0 IGMPv2 packets transmitted
13 output drops due to tx error
0 MPU packets transmitted
0 PPPOE packets received
0 ISDN packets received
0 DIALER packets received
0 PPP packets received from pppd
0 MPU packets received
0 PPP packets received from jppd
0 IGMPv2 packets received
0 Input drops due to bogus protocol
0 input drops due to no mbufs available
0 input drops due to no space in socket
0 input drops due to no socket
arp:
186413 datagrams received
88 ARP requests received
88 ARP replies received
0 resolution request received
0 unrestricted proxy requests
0 restricted proxy requests
0 received proxy requests
0 proxy requests not proxied
0 restricted proxy requests not proxied
0 datagrams with bogus interface
0 datagrams with incorrect length
```

```
0 datagrams for non-IP protocol
0 datagrams with unsupported op code
0 datagrams with bad protocol address length
0 datagrams with bad hardware address length
0 datagrams with multicast source address
0 datagrams with multicast source address
0 datagrams with my own hardware address
164 datagrams for an address not on the interface
0 datagrams with a broadcast source address
0 datagrams with source address duplicate to mine
186065 datagrams which were not for me
0 packets discarded waiting for resolution
0 packets sent after waiting for resolution
50 ARP requests sent
88 ARP replies sent
0 requests for memory denied
0 requests dropped on entry
0 requests dropped during retry
0 requests dropped due to interface deletion
0 requests on unnumbered interfaces
0 new requests on unnumbered interfaces
0 replies for from unnumbered interfaces
0 requests on unnumbered interface with non-subnetted donor
0 replies from unnumbered interface with non-subnetted donor
ip6:
0 total packets received
0 packets with size smaller than minimum
0 packets with data size < data length
0 packets with bad options
0 packets with incorrect version number
0 fragments received
0 fragments dropped (dup or out of space)
0 fragments dropped after timeout
0 fragments that exceeded limit
0 packets reassembled ok
0 packets for this host
0 packets forwarded
0 packets not forwardable
0 redirects sent
0 packets sent from this host
0 packets sent with fabricated ip header
0 output packets dropped due to no bufs, etc.
0 output datagrams fragmented
0 fragments created
0 datagrams that can't be fragmented
0 packets that violated scope rules
0 multicast packets which we don't join
0 packets whose headers are not continuous
0 tunneling packets that can't find gif
0 packets discarded due to too many headers
0 failures of source address selection
0 forward cache hit
0 forward cache miss
0 Packets destined to dead next hop
0 option packets dropped due to rate limit
0 Packets dropped (src and int don't match)
0 packets dropped due to bad protocol
0 transit re packet(null) dropped on mgmt i/f
icmp6:
0 Calls to icmp_error
0 Errors not generated because old message was icmp error
```

```
0 Errors not generated because rate limitation
0 Messages with bad code fields
0 Messages < minimum length
0 Bad checksums
0 Messages with bad length
0 No route
0 Administratively prohibited
0 Beyond scope
0 Address unreachable
0 Port unreachable
0 packet too big
0 Time exceed transit
0 Time exceed reassembly
0 Erroneous header field
0 Unrecognized next header
0 Unrecognized option
0 redirect
0 Unknown
0 Message responses generated
0 Messages with too many ND options
pfkey:
0 Requests sent from userland
0 Bytes sent from userland
histogram by message type:
0 reserved
0 dump
0 Messages with invalid length field
0 Messages with invalid version field
0 Messages with invalid message type field
0 Messages too short
0 Messages with memory allocation failure
0 Messages with duplicate extension
0 Messages with invalid extension type
0 Messages with invalid sa type
0 Messages with invalid address extension
0 Requests sent to userland
0 Bytes sent to userland
histogram by message type:
0 reserved
0 dump
0 Messages toward single socket
0 Messages toward all sockets
0 Messages toward registered sockets
0 Messages with memory allocation failure
cInI:
0 Total packets received
0 Packets delivered
0 Too small packets
0 Packets with bad header length
0 Packets with bad checksum
0 Bad version packets
0 Unknown or unsupported protocol packets
0 Packets with bogus sdl size
0 No free memory in socket buffer
0 Send packets discarded
0 Sbappend failure
0 Mcopy failure
0 Address fields were not reasonable
0 Segment information forgotten
0 Forwarded packets
0 Total packets sent
```

```
0 Output packets discarded
0 Non-forwarded packets
0 Packets fragmented
0 Fragments sent
0 Fragments discarded
0 Fragments timed out
0 Fragmentation prohibited
0 Packets reconstructed
0 Packets destined to dead nexthop
0 Packets discarded due to no route
0 Error pdu rate drops
0 ER pdu generation failure
esis:
0 Total pkts received
0 Total packets consumed by protocol
0 Pdus received with bad checksum
0 Pdus received with bad version number
0 Pdus received with bad type field
0 Short pdus received
0 Pdus with bogus sdl size
0 Pdus with bad header length
0 Pdus with unknown or unsupported protocol
0 No free memory in socket buffer
0 Send packets discarded
0 Sbappend failure
0 Mcopy failure
0 ISO family not configured
tnp:
0 Unicast packets received
0 Broadcast packets received
0 Fragmented packets received
0 Hello packets dropped
0 Fragments dropped
0 Fragment reassembly queue flushes
0 Packets with tnp src address collision received
0 Hello packets received
0 Control packets received
0 Rdp packets received
0 Udp packets received
0 Tunnel packets received
0 Input packets discarded with no protocol
0 Packets of version unspecified received
0 Packets of version 1 received
0 Packets of version 2 received
0 Packets of version 3 received
0 Unicast packets sent
0 Broadcast packets sent
0 Fragmented packets sent
0 Hello packets dropped
0 Fragments dropped
0 Hello packets sent
0 Control packets sent
0 Rdp packets sent
0 Udp packets sent
0 Tunnel packets sent
0 Packets sent with unknown protocol
0 Packets of version unspecified sent
0 Packets of version 1 sent
0 Packets of version 2 sent
0 Packets of version 3 sent
rdp:
```

```
0 Input packets
0 Packets discarded for bad checksum
0 Packets discarded due to bad sequence number
0 Refused connections
0 Acks received
0 Packets dropped due to full socket buffers
0 Retransmits
0 Output packets
0 Acks sent
0 Connects
0 Closes
0 Keepalives received
0 Keepalives sent
tudp:
67 Datagrams received
0 Datagrams with incomplete header
0 Datagrams with bad data length field
0 Datagrams with bad checksum
0 Datagrams dropped due to no socket
0 Broadcast/multicast datagrams dropped due to no socket
0 Datagrams dropped due to full socket buffers
67 Delivered
68 Datagrams output
ttp:
0 Packets sent
0 Packets sent while unconnected
0 Packets sent while interface down
0 Packets sent couldn't get buffer
0 Packets sent couldn't find neighbor
0 L2 packets received
0 Unknown L3 packets received
0 IPv4 L3 packets received
0 MPLS L3 packets received
0 MPLS->IPv4 L3 packets received
0 IPv4->MPLS L3 packets received
0 IPv6 L3 packets received
0 ARP L3 packets received
0 CLNP L3 packets received
0 TNP L3 packets received
0 NULL L3 packets received
0 Cyclotron cycle L3 packets received
0 Cyclotron send L3 packets received
0 Packets received while unconnected
0 Packets received from unknown ifl
0 Input packets couldn't get buffer
0 Input packets with bad type
0 Input packets with discard type
0 Input packets with too many tlvs
0 Input packets with bad tlv header
70633 Input packets with bad tlv type
68877 Input packets dropped based on tlv result0 Input packets for which rt lookup
  is bypassed
mpls:
0 Total MPLS packets received
0 Packets forwarded
0 Packets dropped
0 Packets with header too small
0 After tagging, packets can't fit link MTU
0 Packets with IPv4 explicit NULL tag
0 Packets with IPv4 explicit NULL cksum errors
0 Packets with router alert tag
```



```

0 LSP ping packets (ttl-expired/router alert)
0 Packets with ttl expired
0 Packets with tag encoding error
0 Packets discarded due to no route
0 Packets used first nexthop in ecmp unilist
vpls:
0 Total packets received
0 Packets with size smaller than minimum
0 Packets with incorrect version number
0 Packets for this host
0 Packets with no logical interface
0 Packets with no family
0 Packets with no route table
582 Copyright © 2010, Juniper Networks, Inc.
0 Packets with no auxiliary table
0 Packets with no corefacing entry
0 packets with no CE-facing entry
0 MAC route learning requests
0 MAC routes learnt
0 Requests to learn an existing route
0 Learning requests while learning disabled on interface
0 Learning requests over capacity
0 MAC routes moved
0 Requests to move static route
0 MAC route aging requests
0 MAC routes aged
0 Bogus address in aging requests
0 Requests to age static route
0 Requests to re-ageout aged route
0 Requests involving multiple peer FEs
0 Aging acks from PFE
0 Aging non-acks from PFE
0 Aging requests timed out waiting on FEs
0 Aging requests over max-rate
0 Errors finding peer FEs
0 Unsupported platform
0 Packets dropped due to no l3 route table
0 Packets dropped due to no local ifl
0 Packets punted
0 Packets dropped due to no socket
bridge:
Input:
0 packets received
0 packets forwarded
0 packets failed to forward
0 packets dropped
0 packets with vmember lookup failures
0 packets with vlan lookup failures
0 packets with stp state lookup failures
0 packets dropped due to stp blocked/listening
0 packets dropped due to stp learning
0 packets with src MAC learning failures
0 packets with input control processing failures
Forward:
0 packets sent successfully
0 packets with send failures
0 packets forwarded to l3 interface
0 packets with l3 send failures
0 packets discarded
0 packets with l2ifl store failures
0 packets with ifl mismatch failures

```

```
0 packets with packet duplication failures
0 packets with tag lookup failures
0 packets with no route for DMAC
0 packets with no route table
0 packets with no nexthop
0 packets with dead nexthop
0 packets with eof reached error
Learning:
0 MACs learned
0 packets sent to l3 interface
0 packets with l3 send failures
0 packets hit holdq while learning
0 MAC moves
0 packets discarded
0 packets with no route for SMAC
0 packets with no nexthop
0 packets with dead nexthop
0 packets dropped due to no resolve route
0 packets with l3 ifd lookup failures
0 packets with l3 ifl lookup failures
0 packets with l3 invalid rnh
0 packets with no route for SMAC in clone learning
0 packets with no nexthop in clone learning
0 packets with dead nexthop in clone learning
0 packets dropped due to no resolve nh in clone learning
Output:
0 packets forwarded
0 packets failed to forward
0 packets with vmember lookup failures
0 packets with vlan lookup failures
0 packets with input control processing failures
Send:
0 packets sent successfully
0 packets with send failures
0 packets dropped due to interface down
0 packets with dev output failures
0 blocked ifl discards
0 packets with tag lookup failures
0 packets with stp state lookup failures
0 packets with tag insertion failures
0 packets with tag removal failures
Flood:
0 packets flooded
0 flood failures
IGMP:
0 packets sent successfully
0 packets with send failures
0 packets forwarded
0 packets failed to forward
0 packets with mpull failures
0 packets with vmember lookup failures
0 packets with vlan lookup failures
0 packets with ifl lookup failures
0 packets with tag lookup failures
Misc:
0 packets with size smaller than minimum
0 packets with double tags
0 packets with no ifl
0 packets with no family
0 packets with no route table
```


show system storage

Syntax	show system storage <detail>
Syntax (EX Series Switches)	show system storage <detail> <all-members> <local> <member <i>member-id</i> >
Syntax (MX Series Router)	show system storage <detail> <all-members> <local> <member <i>member-id</i> >
Syntax (QFX Series)	show system storage <detail> <infrastructure <i>name</i> > <interconnect-device <i>name</i> > <node-group <i>name</i> >
Syntax (SRX Series)	show system storage <detail> <partitions> For more information, see show system storage partitions (View SRX Series) .
Syntax (TX Matrix Router)	show system storage <detail> <all-chassis all-lcc lcc <i>number</i> scc>
Syntax (TX Matrix Plus Router and TX Matrix Plus Router with 3D SIBs)	show system storage <detail> <all-chassis all-lcc lcc <i>number</i> sfc <i>number</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 Release 9.6. Command introduced in Junos OS Release 11.1 for the QFX Series.
Description	Display statistics about the amount of free disk space in the router's or switch's file systems.
Options	none —Display standard information about the amount of free disk space in the router's or switch's file systems. detail —(Optional) Display detailed output.

all-chassis—(TX Matrix routers and TX Matrix Plus routers only) (Optional) Display system storage statistics for all the routers in the chassis.

all-lcc—(TX Matrix routers and TX Matrix Plus routers only) (Optional) On a TX Matrix router, display system storage statistics for all T640 routers connected to the TX Matrix router. On a TX Matrix Plus router, display system storage statistics for all routers connected to the TX Matrix Plus router.

all-members—(EX4200 switches and MX Series routers only) (Optional) Display system storage statistics for all members of the Virtual Chassis configuration.

infrastructure *name*—(QFabric systems only) (Optional) Display system storage statistics for the fabric control Routing Engines or fabric manager Routing Engines.

interconnect-device *name*—(QFabric systems only) (Optional) Display system storage statistics for the Interconnect device.

lcc *number*—(TX Matrix routers and TX Matrix Plus routers only) (Optional) On a TX Matrix router, display system storage statistics for a specific T640 router that is connected to the TX Matrix router. On a TX Matrix Plus router, display system storage statistics for a specific router that is connected to the TX Matrix Plus router. Replace *number* with the following values depending on the LCC configuration:

- 0 through 3, when T640 routers are connected to a TX Matrix router in a routing matrix.
- 0 through 3, when T1600 routers are connected to a TX Matrix Plus router in a routing matrix.
- 0 through 7, when T1600 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.
- 0, 2, 4, or 6, when T4000 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.

local—(EX4200 switches and MX Series routers only) (Optional) Display system storage statistics for the local Virtual Chassis member.

member *member-id*—(EX4200 switches and MX Series routers only) (Optional) Display system storage statistics for 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 system storage statistics for the Node group.

scc—(TX Matrix routers only) (Optional) Display system storage statistics for the TX Matrix router (or switch-card chassis).

sfc *number*—(TX Matrix Plus routers only) (Optional) Display system storage statistics for the TX Matrix Plus router. Replace *number* with 0.

Additional Information By default, when you issue the **show system storage** command on the master Routing Engine of a TX Matrix router or a TX Matrix Plus router, the command is broadcast to all the master Routing Engines of the LCCs connected to it in the routing matrix. Likewise, if you issue the same command on the backup Routing Engine of a TX Matrix or a TX Matrix Plus router, the command is broadcast to all backup Routing Engines of the LCCs that are connected to it in the routing matrix.

Required Privilege Level view

Related Documentation

- [Routing Matrix with a TX Matrix Plus Router Solutions Page](#)
- [show system storage partitions \(View SRX Series\)](#)

List of Sample Output [show system storage on page 349](#)
[show system storage \(TX Matrix Plus Router\) on page 349](#)
[show system storage \(QFX3500 Switch\) on page 351](#)

Output Fields [Table 12 on page 348](#) describes the output fields for the **show system storage** command. Output fields are listed in the approximate order in which they appear.

Table 12: show system storage Output Fields

Field Name	Field Description
Filesystem	Name of the filesystem.
Size	Size of the filesystem.
Used	Amount of space used in the filesystem.
Avail	Amount of space available in the filesystem.
Capacity	Percentage of the filesystem space that is being used.
Mounted on	Directory in which the filesystem is mounted.

Sample Output

show system storage

```
user@host> show system storage
Filesystem      Size      Used      Avail  Capacity  Mounted on
/dev/ad0s1a      77M       37M       34M      52%      /
devfs           16K       16K        0B     100%    /dev/
/dev/vn0        12M       12M        0B     100%    /packages/mnt/jbase
/dev/vn1        39M       39M        0B     100%
/packages/mnt/jkernel-7.2R1.7
/dev/vn2        12M       12M        0B     100%
/packages/mnt/jpfe-M40-7.2R1.7
/dev/vn3        2.3M      2.3M        0B     100%
/packages/mnt/jdocs-7.2R1.7
/dev/vn4        14M       14M        0B     100%
/packages/mnt/jroute-7.2R1.7
/dev/vn5        4.5M      4.5M        0B     100%
/packages/mnt/jcrypto-7.2R1.7
mfs:172         1.5G      4.0K       1.3G      0%    /tmp
/dev/ad0s1e      12M       20K       11M      0%    /config
procfs          4.0K      4.0K        0B     100%    /proc
/dev/ad1s1f      9.4G      4.9G       3.7G     57%    /var
```

show system storage (TX Matrix Plus Router)

```
user@host> show system storage
sfc0-re0:
-----
Filesystem      Size      Used      Avail  Capacity  Mounted on
/dev/ad0s1a      3.4G      178M      2.9G      6%      /
devfs           1.0K      1.0K        0B     100%    /dev
devfs           1.0K      1.0K        0B     100%    /dev/
/dev/md0         33M       33M        0B     100%    /packages/mnt/jbase
/dev/md1        216M      216M        0B     100%
/packages/mnt/jkernel-9.6-20090519.0
/dev/md2         66M       66M        0B     100%
/packages/mnt/jpfe-T-9.6-20090519.0
/dev/md3         4.1M      4.1M        0B     100%
/packages/mnt/jdocs-9.6-20090519.0
/dev/md4         57M       57M        0B     100%
/packages/mnt/jroute-9.6-20090519.0
/dev/md5         15M       15M        0B     100%
/packages/mnt/jcrypto-9.6-20090519.0
/dev/md6         34M       34M        0B     100%
/packages/mnt/jpfe-common-9.6-20090519.0
/dev/md7         2.0G     10.0K      1.8G      0%    /tmp
/dev/md8         2.0G      1.0M      1.8G      0%    /mfs
/dev/ad0s1e      383M       82K      352M      0%    /config
procfs          4.0K      4.0K        0B     100%    /proc
/dev/ad1s1f      52G       7.5G       40G     16%    /var

lcc0-re0:
-----
Filesystem      Size      Used      Avail  Capacity  Mounted on
/dev/ad0s1a      3.4G      178M      2.9G      6%      /
devfs           1.0K      1.0K        0B     100%    /dev
devfs           1.0K      1.0K        0B     100%    /dev/
/dev/md0         33M       33M        0B     100%    /packages/mnt/jbase
/dev/md1        216M      216M        0B     100%
/packages/mnt/jkernel-9.6-20090519.0
/dev/md2         66M       66M        0B     100%
/packages/mnt/jpfe-T-9.6-20090519.0
```

/dev/md3	4.1M	4.1M	0B	100%	
/packages/mnt/jdocs-9.6-20090519.0					
/dev/md4	57M	57M	0B	100%	
/packages/mnt/jroute-9.6-20090519.0					
/dev/md5	15M	15M	0B	100%	
/packages/mnt/jcrypto-9.6-20090519.0					
/dev/md6	34M	34M	0B	100%	
/packages/mnt/jpfe-common-9.6-20090519.0					
/dev/md7	2.0G	10.0K	1.8G	0%	/tmp
/dev/md8	2.0G	540K	1.8G	0%	/mfs
/dev/ad0s1e	383M	88K	352M	0%	/config
procfs	4.0K	4.0K	0B	100%	/proc
/dev/ad1s1f	52G	6.3G	41G	13%	/var

lcc1-re0:

Filesystem	Size	Used	Avail	Capacity	Mounted on
/dev/ad0s1a	3.4G	178M	2.9G	6%	/
devfs	1.0K	1.0K	0B	100%	/dev
devfs	1.0K	1.0K	0B	100%	/dev/
/dev/md0	33M	33M	0B	100%	/packages/mnt/jbase
/dev/md1	216M	216M	0B	100%	
/packages/mnt/jkernel-9.6-20090519.0					
/dev/md2	66M	66M	0B	100%	
/packages/mnt/jpfe-T-9.6-20090519.0					
/dev/md3	4.1M	4.1M	0B	100%	
/packages/mnt/jdocs-9.6-20090519.0					
/dev/md4	57M	57M	0B	100%	
/packages/mnt/jroute-9.6-20090519.0					
/dev/md5	15M	15M	0B	100%	
/packages/mnt/jcrypto-9.6-20090519.0					
/dev/md6	34M	34M	0B	100%	
/packages/mnt/jpfe-common-9.6-20090519.0					
/dev/md7	2.0G	10.0K	1.8G	0%	/tmp
/dev/md8	2.0G	540K	1.8G	0%	/mfs
/dev/ad0s1e	383M	88K	352M	0%	/config
procfs	4.0K	4.0K	0B	100%	/proc
/dev/ad1s1f	23G	13G	7.7G	64%	/var

lcc2-re0:

Filesystem	Size	Used	Avail	Capacity	Mounted on
/dev/ad0s1a	3.4G	178M	2.9G	6%	/
devfs	1.0K	1.0K	0B	100%	/dev
devfs	1.0K	1.0K	0B	100%	/dev/
/dev/md0	33M	33M	0B	100%	/packages/mnt/jbase
/dev/md1	216M	216M	0B	100%	
/packages/mnt/jkernel-9.6-20090519.0					
/dev/md2	66M	66M	0B	100%	
/packages/mnt/jpfe-T-9.6-20090519.0					
/dev/md3	4.1M	4.1M	0B	100%	
/packages/mnt/jdocs-9.6-20090519.0					
/dev/md4	57M	57M	0B	100%	
/packages/mnt/jroute-9.6-20090519.0					
/dev/md5	15M	15M	0B	100%	
/packages/mnt/jcrypto-9.6-20090519.0					
/dev/md6	34M	34M	0B	100%	
/packages/mnt/jpfe-common-9.6-20090519.0					
/dev/md7	2.0G	10.0K	1.8G	0%	/tmp
/dev/md8	2.0G	540K	1.8G	0%	/mfs
/dev/ad0s1e	383M	64K	352M	0%	/config


```

procfs          4.0K      4.0K      0B      100% /proc
/dev/ad1s1f     23G      3.7G      17G      18%  /var

lcc3-re0:
-----
Filesystem      Size      Used      Avail  Capacity  Mounted on
/dev/ad0s1a     3.4G      178M      2.9G      6%        /
devfs           1.0K      1.0K      0B      100%     /dev
devfs           1.0K      1.0K      0B      100%     /dev/
/dev/md0        33M       33M       0B      100%     /packages/mnt/jbase
/dev/md1        216M      216M       0B      100%
/packages/mnt/jkernel-9.6-20090519.0
/dev/md2        66M       66M       0B      100%
/packages/mnt/jpfe-T-9.6-20090519.0
/dev/md3        4.1M      4.1M       0B      100%
/packages/mnt/jdocs-9.6-20090519.0
/dev/md4        57M       57M       0B      100%
/packages/mnt/jroute-9.6-20090519.0
/dev/md5        15M       15M       0B      100%
/packages/mnt/jcrypto-9.6-20090519.0
/dev/md6        34M       34M       0B      100%
/packages/mnt/jpfe-common-9.6-20090519.0
/dev/md7        2.0G      10.0K      1.8G      0%        /tmp
/dev/md8        2.0G      540K      1.8G      0%        /mfs
/dev/ad0s1e     383M      34K       352M      0%        /config
procfs          4.0K      4.0K      0B      100%     /proc
/dev/ad1s1f     23G      18G       3.5G      84%     /var

```

show system storage (QFX3500 Switch)

```

user@switch> show system storage
Filesystem      Size      Used      Avail  Capacity  Mounted on
/dev/da0s2a     343M      192M      123M      61%        /
devfs           1.0K      1.0K      0B      100%     /dev
/dev/md0        119M      119M       0B      100%     /packages/mnt/jbase
/dev/md1        513M      513M       0B      100%
/packages/mnt/jkernel-qfx-11.1R1.5
/dev/md2        37M       37M       0B      100%
/packages/mnt/jpfe-qfx-e9xxx-11.1R1.5
/dev/md3        6.0M      6.0M       0B      100%
/packages/mnt/jdocs-qfx-11.1R1.5
/dev/md4        216M      216M       0B      100%
/packages/mnt/jroute-qfx-11.1R1.5
/dev/md5        59M       59M       0B      100%
/packages/mnt/jcrypto-qfx-11.1R1.5
/dev/md6        85M       85M       0B      100%
/packages/mnt/jswitch-qfx-11.1R1.5
/dev/md7        63M       8.0K      58M      0%        /tmp
/dev/da0s2f     228M      14M      196M      7%        /var
/dev/da0s3d     590M      3.0M      540M      1%        /var/tmp
/dev/da0s3e     104M      162K      95M      0%        /config
procfs          4.0K      4.0K      0B      100%     /proc

```

show system switchover

Syntax	show system switchover
Syntax (TX Matrix Router)	show system switchover <all-chassis all-lcc lcc <i>number</i> scc>
Syntax (TX Matrix Plus Router)	show system switchover <all-chassis all-lcc lcc <i>number</i> sfc <i>number</i> >
Syntax (MX Series Router)	show system switchover <all-members> <local> <member <i>member-id</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.
Description	Display whether graceful Routing Engine switchover is configured, the state of the kernel replication (ready or synchronizing), any replication errors, and whether the primary and standby Routing Engines are using compatible versions of the kernel database.



NOTE: Issue the `show system switchover` command *only* on the backup Routing Engine. This command is *not* supported on the master Routing Engine, because the kernel-replication process daemon does not run on the master Routing Engine. This process runs only on the backup Routing Engine.

Beginning Junos OS Release 9.6, the `show system switchover` command has been deprecated on the master Routing Engine on all routers other than a TX Matrix (switch-card chassis) or a TX Matrix Plus (switch-fabric chassis) router.

However, in a routing matrix, if you issue the `show system switchover` command on the master Routing Engine of the TX Matrix router (or switch-card chassis), the CLI displays graceful switchover information for the master Routing Engine of the T640 routers (or line-card chassis) in the routing matrix. Likewise, if you issue the `show system switchover` command on the master Routing Engine of a TX Matrix Plus router (or switch-fabric chassis), the CLI displays output for the master Routing Engine of T1600 or T4000 routers in the routing matrix.

Options **all-chassis**—(TX Matrix routers and TX Matrix Plus routers only) (Optional) On a TX Matrix router, display graceful Routing Engine switchover information for all Routing Engines on the TX Matrix router and the T640 routers configured in the routing matrix. On a TX Matrix Plus router, display graceful Routing Engine switchover information for all

Routing Engines on the TX Matrix Plus router and the T1600 or T4000 routers configured in the routing matrix.

all-lcc—(TX Matrix routers and TX Matrix Plus routers only) (Optional) On a TX Matrix router, display graceful Routing Engine switchover information for all T640 routers (or line-card chassis) connected to the TX Matrix router. On a TX Matrix Plus router, display graceful Routing Engine switchover information for all connected T1600 or T4000 LCCs.

Note that in this instance, packets get dropped. The LCCs perform GRES on their own chassis (GRES cannot be handled by one particular chassis for the entire router) and synchronization is not possible as the LCC plane bringup time varies for each LCC. Therefore, when there is traffic on these planes, there may be a traffic drop.

all-members—(MX Series routers only) (Optional) Display graceful Routing Engine switchover information for all Routing Engines on all members of the Virtual Chassis configuration.

lcc number—(TX Matrix routers and TX Matrix Plus routers only) (Optional) On a TX Matrix router, display graceful Routing Engine switchover information for a specific T640 router connected to the TX Matrix router. On a TX Matrix Plus router, display graceful Routing Engine switchover information for a specific router connected to the TX Matrix Plus router.

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

- 0 through 3, when T640 routers are connected to a TX Matrix router in a routing matrix.
- 0 through 3, when T1600 routers are connected to a TX Matrix Plus router in a routing matrix.
- 0 through 7, when T1600 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.
- 0, 2, 4, or 6, when T4000 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.

local—(MX Series routers only) (Optional) Display graceful Routing Engines switchover information for all Routing Engines on the local Virtual Chassis member.

member member-id—(MX Series routers only) (Optional) Display graceful Routing Engine switchover information for all Routing Engines on the specified member of the Virtual Chassis configuration. Replace *member-id* with a value of 0 or 1.

scc—(TX Matrix router only) (Optional) Display graceful Routing Engine switchover information for the TX Matrix router (or switch-card chassis).

sfc—(TX Matrix Plus routers only) (Optional) Display graceful Routing Engine switchover information for the TX Matrix Plus router.

Additional Information If you issue the **show system switchover** command on a TX Matrix backup Routing Engine, the command is broadcast to all the T640 backup Routing Engines that are connected to it.

Likewise, if you issue the **show system switchover** command on a TX Matrix Plus backup Routing Engine, the command is broadcast to all the T1600 or T4000 backup Routing Engines that are connected to it.

If you issue the **show system switchover** command on the active Routing Engine in the master router of an MX Series Virtual Chassis, the router displays an error message that graceful Routing Engine switchover (GRES) is not enabled on this member.

Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> • Routing Matrix with a TX Matrix Plus Router Solutions Page
List of Sample Output	show system switchover (Backup Routing Engine) on page 355 show system switchover all-lcc (Routing Matrix) on page 355
Output Fields	Table 13 on page 354 describes the output fields for the show system switchover command. Output fields are listed in the approximate order in which they appear.

Table 13: show system switchover Output Fields

Field Name	Field Description
Graceful switchover	Display graceful Routing Engine switchover status: <ul style="list-style-type: none"> • On—Indicates graceful-switchover is specified for the routing-options configuration command. • Off—Indicates graceful-switchover is not specified for the routing-options configuration command.
Configuration database	State of the configuration database: <ul style="list-style-type: none"> • Ready—Configuration database has synchronized. • Synchronizing—Configuration database is synchronizing. Displayed when there are updates within the last 5 seconds. • Synchronize failed—Configuration database synchronize process failed.
Kernel database	State of the kernel database: <ul style="list-style-type: none"> • Ready—Kernel database has synchronized. • Synchronizing—Kernel database is synchronizing. Displayed when there are updates within the last 5 seconds. • Version incompatible—The primary and standby Routing Engines are running incompatible kernel database versions. • Replication error—An error occurred when the state was replicated from the primary Routing Engine. Inspect Steady State for possible causes, or notify Juniper Networks customer support.
Peer state	Routing Engine peer state: <ul style="list-style-type: none"> • Steady State—Peer completed switchover transition. • Peer Connected—Peer in switchover transition.

Sample Output

`show system
switchover (Backup
Routing Engine)`

```
user@host> show system switchover
Graceful switchover: On
Configuration database: Ready
Kernel database: Ready
Peer state: Steady State
```

`show system
switchover all-lcc
(Routing Matrix)`

```
user@host> show system switchover all-lcc
```

```
lcc0-re0:
```

```
-----
Multichassis replication: On
Configuration database: Ready
Kernel database: Ready
Peer state: Steady State
```

```
lcc2-re0:
```

```
-----
Multichassis replication: On
Configuration database: Ready
Kernel database: Ready
Peer state: Steady State
```

show system uptime

Syntax	show system uptime
Syntax (EX Series Switches)	show system uptime <all-members> <local> <member <i>member-id</i> >
Syntax (QFX Series)	show system uptime <director-group <i>name</i> > <infrastructure <i>name</i> > <interconnect-device <i>name</i> > <node-group <i>name</i> >
Syntax (TX Matrix Router)	show system uptime <all-chassis all-lcc lcc <i>number</i> scc>
Syntax (TX Matrix Plus Router)	show system uptime <detail> <all-chassis all-lcc lcc <i>number</i> sfc <i>number</i> >
Syntax (MX Series Router)	show system uptime <all-members> <invoke-on> <local> <member <i>member-id</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 Release 9.6. Command introduced in Junos OS Release 11.1 for the QFX Series.
Description	Display the current time and information about how long the router or switch, router or switch software, and routing protocols have been running.
Options	none —Show time since the system rebooted and processes started. all-chassis —(TX Matrix routers and TX Matrix Plus routers only) (Optional) Show time since the system rebooted and processes started on all the routers in the chassis. all-lcc —(TX Matrix routers and TX Matrix Plus routers only) (Optional) On a TX Matrix router, show time since the system rebooted and processes started for all T640 routers (or line-card chassis) connected to the TX Matrix router. On a TX Matrix Plus router, show time since the system rebooted and processes started for all connected T1600 or T4000 LCCs. all-members —(EX4200 switches and MX Series routers only) (Optional) Show time since the system rebooted and processes started on all members of the Virtual Chassis configuration.

director-group *name*—(QFabric systems only) (Optional) Show time since the system rebooted and processes started on the Director group.

infrastructure *name*—(QFabric systems only) (Optional) Show time since the system rebooted and processes started on the fabric control Routing Engine and fabric manager Routing Engine.

interconnect-device *name*—(QFabric systems only) (Optional) Show time since the system rebooted and processes started on the Interconnect device.

invoke-on—(MX Series routers only) (Optional) Display the time since the system rebooted and processes started on the master Routing Engine, backup Routing Engine, or both, on a router with two Routing Engines.

lcc *number*—(TX Matrix routers and TX Matrix Plus routers only) (Optional) On a TX Matrix router, show time since the system rebooted and processes started for a specific T640 router that is connected to the TX Matrix router. On a TX Matrix Plus router, show time since the system rebooted and processes started for a specific router that is connected to the TX Matrix Plus router.

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

- 0 through 3, when T640 routers are connected to a TX Matrix router in a routing matrix.
- 0 through 3, when T1600 routers are connected to a TX Matrix Plus router in a routing matrix.
- 0 through 7, when T1600 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.
- 0, 2, 4, or 6, when T4000 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.

local—(EX4200 switches and MX Series routers only) (Optional) Show time since the system rebooted and processes started on the local Virtual Chassis member.

member *member-id*—(EX4200 switches and MX Series routers only) (Optional) Show time since the system rebooted and processes started 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) Show time since the system rebooted and processes started on the Node group.

scc—(TX Matrix routers only) (Optional) Show time since the system rebooted and processes started for the TX Matrix router (or switch-card chassis).

sfc *number*—(TX Matrix Plus routers only) (Optional) Show time since the system rebooted and processes started for the TX Matrix Plus router. Replace *number* with 0.

Additional Information By default, when you issue the **show system uptime** command on the master Routing Engine of a TX Matrix router or a TX Matrix Plus router, the command is broadcast to all the master Routing Engines of the LCCs connected to it in the routing matrix. Likewise, if you issue the same command on the backup Routing Engine of a TX Matrix or a TX Matrix Plus router, the command is broadcast to all backup Routing Engines of the LCCs that are connected to it in the routing matrix.

Required Privilege Level view

Related Documentation

- *Monitoring System Process Information*
- *Monitoring System Properties*
- *10-Gigabit Ethernet LAN/WAN PIC with XFP (T640 Router)*
- *Routing Matrix with a TX Matrix Plus Router Solutions Page*

List of Sample Output

[show system uptime on page 359](#)
[show system uptime all-lcc \(TX Matrix Router\) on page 359](#)
[show system uptime all-lcc \(TX Matrix Plus Router\) on page 359](#)
[show system uptime \(QFX Series\) on page 360](#)

Output Fields [Table 14 on page 358](#) describes the output fields for the **show system uptime** command. Output fields are listed in the approximate order in which they appear.

Table 14: show system uptime Output Fields

Field Name	Field Description
Current time	Current system time in UTC.
System booted	Date and time when the Routing Engine on the router or switch was last booted and how long it has been running.
Protocols started	Date and time when the routing protocols were last started and how long they have been running.
Last configured	Date and time when a configuration was last committed. Also shows the name of the user who issued the last commit command.
time and up	Current time, in the local time zone, and how long the router or switch has been operational.
users	Number of users logged in to the router or switch.
load averages	Load averages for the last 1 minute, 5 minutes, and 15 minutes.

Sample Output

show system uptime

```
user@host> show system uptime
Current time:      1998-10-13 19:45:47 UTC
System booted:     1998-10-12 20:51:41 UTC (22:54:06 ago)
Protocols started: 1998-10-13 19:33:45 UTC (00:12:02 ago)
Last configured:   1998-10-13 19:33:45 UTC (00:12:02 ago) by abc
12:45PM up 22:54, 2 users, load averages: 0.07, 0.02, 0.01
```

show system uptime all-lcc (TX Matrix Router)

```
user@host> show system uptime all-lcc
lcc0-re0:
-----
Current time: 2004-09-13 09:55:35 PDT
System booted: 2004-09-13 03:13:55 PDT (06:41:40 ago)
Last configured: 2004-09-13 03:17:48 PDT (06:37:47 ago) by root
9:55AM PDT up 6:42, 1 user, load averages: 0.02, 0.03, 0.00
lcc2-re0:
-----
Current time: 2004-09-13 09:55:35 PDT
System booted: 2004-09-12 03:23:43 PDT (1d 06:31 ago)
Last configured: 2004-09-13 03:05:36 PDT (06:49:59 ago) by root
9:55AM PDT up 1 day, 6:32, 1 user, load averages: 0.02, 0.01, 0.00
```

show system uptime all-lcc (TX Matrix Plus Router)

```
user@host> show system uptime all-lcc
sfc0-re0:
-----
Current time: 2009-05-25 00:24:30 PDT
System booted: 2009-05-24 06:39:33 PDT (17:44:57 ago)
Protocols started: 2009-05-24 06:40:30 PDT (17:44:00 ago)
Last configured: 2009-05-24 06:33:27 PDT (17:51:03 ago) by gregdo
12:24AM up 17:45, 2 users, load averages: 0.07, 0.05, 0.01

lcc0-re0:
-----
Current time: 2009-05-25 00:24:30 PDT
System booted: 2009-05-24 06:39:46 PDT (17:44:44 ago)
error: the routing subsystem is not running
Last configured: 2009-05-24 06:40:47 PDT (17:43:43 ago) by root
12:24AM up 17:45, 0 users, load averages: 0.00, 0.00, 0.00

lcc1-re0:
-----
Current time: 2009-05-25 00:24:30 PDT
System booted: 2009-05-24 06:39:38 PDT (17:44:52 ago)
error: the routing subsystem is not running
Last configured: 2009-05-24 06:40:18 PDT (17:44:12 ago) by root
12:24AM up 17:45, 0 users, load averages: 0.00, 0.00, 0.00

lcc2-re0:
-----
Current time: 2009-05-25 00:24:30 PDT
System booted: 2009-05-24 06:39:48 PDT (17:44:42 ago)
error: the routing subsystem is not running
Last configured: 2009-05-24 06:40:44 PDT (17:43:46 ago) by root
12:24AM up 17:45, 0 users, load averages: 0.00, 0.00, 0.00

lcc3-re0:
-----
```

```
Current time: 2009-05-25 00:24:30 PDT
System booted: 2009-05-24 06:39:44 PDT (17:44:46 ago)
error: the routing subsystem is not running
Last configured: 2009-05-24 06:40:08 PDT (17:44:22 ago) by root
12:24AM up 17:45, 0 users, load averages: 0.00, 0.00, 0.00
```

**show system uptime
(QFX Series)**

```
user@switch> show system uptime
Current time: 2010-08-27 03:12:30 PDT
System booted: 2010-08-13 17:11:54 PDT (1w6d 10:00 ago)
Protocols started: 2010-08-13 17:13:56 PDT (1w6d 09:58 ago)
Last configured: 2010-08-26 05:54:00 PDT (21:18:30 ago) by regress
3:12AM up 13 days, 10:01, 3 users, load averages: 0.00, 0.00, 0.00
```

show system virtual-memory

Syntax	show system virtual-memory
Syntax (EX Series)	show system virtual-memory <all-members> <local> <member <i>member-id</i> >
Syntax (TX Matrix Router)	show system virtual-memory <all-chassis all-lcc lcc <i>number</i> scc>
Syntax (TX Matrix Plus Router)	show system virtual-memory <all-chassis all-lcc lcc <i>number</i> sfc <i>number</i> >
Syntax (MX Series Router)	show system virtual-memory <all-members> <local> <member <i>member-id</i> >
Syntax (QFX Series)	show system virtual-memory <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 the usage of Junos OS kernel memory listed first by size of allocation and then by type of usage. Use the show system virtual-memory command for troubleshooting with Juniper Networks Customer Support.
Options	<p>none—Display kernel dynamic memory usage information.</p> <p>all-chassis—(TX Matrix routers and TX Matrix Plus routers only) (Optional) Display kernel dynamic memory usage information for all chassis.</p> <p>all-lcc—(TX Matrix routers and TX Matrix Plus routers only) (Optional) On a TX Matrix router, display kernel dynamic memory usage information for all T640 routers connected to the TX Matrix router. On a TX Matrix Plus router, display kernel dynamic memory usage information for all connected T1600 or T4000 LCCs.</p> <p>all-members—(EX4200 switches and MX Series routers only) (Optional) Display kernel dynamic memory usage information for all members of the Virtual Chassis configuration.</p> <p>infrastructure <i>name</i>—(QFabric systems only) (Optional) Display kernel dynamic memory usage information for the fabric control Routing Engine and fabric manager Routing Engine.</p>

interconnect-device *name*—(QFabric systems only) (Optional) Display kernel dynamic memory usage information for the Interconnect device.

lcc *number*—(TX Matrix routers and TX Matrix Plus routers only) (Optional) On a TX Matrix router, display kernel dynamic memory usage information for a specific T640 router that is connected to the TX Matrix router. On a TX Matrix Plus router, display kernel dynamic memory usage information for a specific router that is connected to the TX Matrix Plus router.

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

- 0 through 3, when T640 routers are connected to a TX Matrix router in a routing matrix.
- 0 through 3, when T1600 routers are connected to a TX Matrix Plus router in a routing matrix.
- 0 through 7, when T1600 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.
- 0, 2, 4, or 6, when T4000 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.

local—(EX4200 switches and MX Series routers only) (Optional) Display kernel dynamic memory usage information for the local Virtual Chassis member.

member *member-id*—(EX4200 switches and MX Series routers only) (Optional) Display kernel dynamic memory usage information for 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 kernel dynamic memory usage information for the Node group.

scc—(TX Matrix routers only) (Optional) Display kernel dynamic memory usage information for the TX Matrix router (or switch-card chassis).

sfc *number*—(TX Matrix Plus routers only) (Optional) Display kernel dynamic memory usage information for the TX Matrix Plus router. Replace *number* with 0.

Additional Information By default, when you issue the **show system virtual-memory** command on the master Routing Engine of a TX Matrix router or a TX Matrix Plus router, the command is broadcast to all the master Routing Engines of the LCCs connected to it in the routing matrix. Likewise, if you issue the same command on the backup Routing Engine of a TX Matrix or a TX Matrix Plus router, the command is broadcast to all backup Routing Engines of the LCCs that are connected to it in the routing matrix.



NOTE: The `show system virtual-memory` command with the `| display XML` pipe option now displays XML output for the command in the parent tags: `<vmstat-memstat-malloc>`, `<vmstat-memstat-zone>`, `<vmstat-sumstat>`, `<vmstat-intr>`, and `<vmstat-kernel-state>` with each child element as a separate XML tag. In Junos OS Releases 10.1 and earlier, the `| display XML` option for this command does not have an XML API element and the entire output is displayed in a single `<output>` tag element.

Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> • Routing Matrix with a TX Matrix Plus Router Solutions Page
List of Sample Output	show system virtual-memory on page 366 show system virtual-memory scc (TX Matrix Router) on page 370 show system virtual-memory sfc (TX Matrix Plus Router) on page 370 show system virtual-memory display xml on page 374 show system virtual-memory (QFX Series) on page 396
Output Fields	<p>Table 15 on page 364 lists the output fields for the <code>show system virtual-memory</code> command. Output fields are listed in the approximate order in which they appear.</p>

Table 15: show system virtual-memory Output Fields

Field Name	Field Description
Memory statistics by bucket size	
Size	Memory block size (bytes). The kernel memory allocator appropriates blocks of memory whose size is exactly a power of 2.
In Use	Number of memory blocks of this size that are in use (bytes).
Free	Number of memory blocks of this size that are free (bytes).
Requests	Number of memory allocation requests made.
HighWater	Maximum value the free list can have. Once the system starts reclaiming physical memory, it continues until the free list is increased to this value.
Couldfree	Total number of times that the free elements for a bucket size exceed the high-water mark for that bucket size.
Memory usage type by bucket size	
Size	Memory block size (bytes).
Type(s)	Kernel modules that are using these memory blocks. For a definition of each type, refer to a FreeBSD book.
Memory statistics by type	
Type	Kernel module that is using dynamic memory.
InUse	Number of memory blocks used by this type. The number is rounded up.
MemUse	Amount of memory in use, in kilobytes (KB).
HighUse	Maximum memory ever used by this type.
Limit	Maximum memory that can be allocated to this type.
Requests	Total number of dynamic memory allocation requests this type has made.
Type Limit	Number of times requests were blocked for reaching the maximum limit.
Kern Limit	Number of times requests were blocked for the kernel map.
Size(s)	Memory block sizes this type is using.
Memory Totals	
In Use	Total kernel dynamic memory in use (bytes, rounded up).
Free	Total kernel dynamic memory free (bytes, rounded up).

Table 15: show system virtual-memory Output Fields (*continued*)

Field Name	Field Description
Requests	Total number of memory allocation requests.
ITEM	Kernel module that is using memory.
Size	Memory block size (bytes).
Limit	Maximum memory that can be allocated to this type.
Used	Number of memory blocks used by this type. The number is rounded up.
Free	Number of memory blocks available to this type.
Requests	Total number of memory allocation requests this type has made.
interrupt	Timer events and scheduling interruptions.
total	Total number of interruptions for each type.
rate	Interruption rate.
Total	Total for all interruptions.

Sample Output

show system
virtual-memory

user@host> show system virtual-memory

Memory statistics by bucket size

Size	In Use	Free	Requests	HighWater	Couldfree
16	906	118	154876	1280	0
32	455	313	209956	640	0
64	4412	260	75380	320	20
128	3200	32	19361	160	81
256	1510	10	8844	80	4
512	446	2	5085	40	0
1K	18	2	5901	20	0
2K	1128	2	4445	10	1368
4K	185	1	456	5	0
8K	5	1	2653	5	0
16K	181	0	233	5	0
32K	2	0	1848	5	0
64K	20	0	22	5	0
128K	5	0	5	5	0
256K	2	0	2	5	0
512K	1	0	1	5	0

Memory usage type by bucket size

Size	Type(s)
16	uc_devlist, nexusdev, iftable, temp, devbuf, atexit, COS, BPF, DEVFS mount, DEVFS node, vnodes, mount, pcb, soname, proc-args, kld, MD disk, rman, ATA generic, bus, sysctl, ippool, pfestat, ifstate, pfe_ipc, mkey, rtable, ifmaddr, ipfw, rnode
32	atkbddev, dirrem, mkdir, diradd, freefile, freefrag, indirdep, bmsafemap, newblk, temp, devbuf, COS, vnodes, cluster_save buffer, pcb, soname, proc-args, sigio, kld, Gzip trees, taskqueue, SWAP, eventhandler, bus, sysctl, uidinfo, subproc, pgrp, pfestat, itable32, ifstate, pfe_ipc, mkey, rtable, ifmaddr, ipfw, rnode, rtnexthop
64	isadev, iftable, MFS node, allocindir, allocdirect, pagedep, temp, devbuf, lockf, COS, NULLFS hash, DEVFS name, vnodes, cluster_save buffer, vfscache, pcb, soname, proc-args, file, AR driver, AD driver, Gzip trees, rman, eventhandler, bus, sysctl, subproc, pfestat, pic, ifstate, pfe_ipc, mkey, ifaddr, rtable, ipfw
128	ZONE, freeblks, inodedep, temp, devbuf, zombie, COS, DEVFS node, vnodes, mount, vfscache, pcb, soname, proc-args, ttys, dev_t, timecounter, kld, Gzip trees, ISOFS node, bus, uidinfo, cred, session, pic, itable16, ifstate, pfe_ipc, rtable, ifstat, metrics, rtnexthop, iffamily
256	iflogical, iftable, MFS node, FFS node, newblk, temp, devbuf, NFS daemon, vnodes, proc-args, kqueue, file desc, Gzip trees, bus, subproc, itable16, ifstate, pfe_ipc, sysctl, rtnexthop
512	UFS mount, temp, devbuf, mount, BIO buffer, ptys, ttys, AR driver, Gzip trees, ISOFS mount, msg, ioctlops, ATA generic, bus, proc, pfestat, lr, ifstate, pfe_ipc, rtable, ipfw, ifstat, rtnexthop
1K	iftable, temp, devbuf, NQNF Lease, kqueue, kld, AD driver, Gzip trees, sem, MD disk, bus, ifstate, pfe_ipc, ipfw
2K	uc_devlist, UFS mount, temp, devbuf, BIO buffer, pcb, AR driver, Gzip trees, ioctlops, bus, ipfw, ifstat, rcache
4K	memdesc, iftable, UFS mount, temp, devbuf, kld, Gzip trees, sem, msg
8K	temp, devbuf, syncache, Gzip trees
16K	indirdep, temp, devbuf, shm, msg
32K	pagedep, kld, Gzip trees
64K	VM pgdata, devbuf, MSDOSFS mount
128K	UFS ihash, inodedep, NFS hash, kld, ISOFS mount
256K	mbuf, vfscache

512K SWAP

Memory statistics by type					Type	Kern	
Type	InUse	MemUse	HighUse	Limit	Requests	Limit	Limit Size(s)
isadev	13	1K	1K127753K	13	0	0	64
atkbddev	2	1K	1K127753K	2	0	0	32
uc_devlist	24	3K	3K127753K	24	0	0	16,2K
nexusdev	3	1K	1K127753K	3	0	0	16
memdesc	1	4K	4K127753K	1	0	0	4K
mbuf	1	152K	152K127753K	1	0	0	256K
iflogical	6	2K	2K127753K	6	0	0	256
iftable	17	9K	9K127753K	18	0	0	16,64,256,1K,4K
ZONE	15	2K	2K127753K	15	0	0	128
VM pgdata	1	64K	64K127753K	1	0	0	64K
UFS mount	12	26K	26K127753K	12	0	0	512,2K,4K
UFS ihash	1	128K	128K127753K	1	0	0	128K
MFS node	6	2K	3K127753K	35	0	0	64,256
FFS node	906	227K	227K127753K	1352	0	0	256
dirrem	0	0K	4K127753K	500	0	0	32
mkdir	0	0K	1K127753K	38	0	0	32
diradd	0	0K	6K127753K	521	0	0	32
freefile	0	0K	4K127753K	374	0	0	32
freeblks	0	0K	8K127753K	219	0	0	128
freefrag	0	0K	1K127753K	193	0	0	32
allocindir	0	0K	25K127753K	1518	0	0	64
indirdep	0	0K	17K127753K	76	0	0	32,16K
allocdirect	0	0K	10K127753K	760	0	0	64
bmsafemap	0	0K	1K127753K	72	0	0	32
newblk	1	1K	1K127753K	2279	0	0	32,256
inodedep	1	128K	175K127753K	2367	0	0	128,128K
pagedep	1	32K	33K127753K	47	0	0	64,32K
temp	1239	92K	96K127753K	8364	0	0	16,32,64K
devbuf	1413	5527K	5527K127753K	1535	0	0	16,32,64,128,256
lockf	38	3K	3K127753K	2906	0	0	64
atexit	1	1K	1K127753K	1	0	0	16
zombie	0	0K	2K127753K	3850	0	0	128
NFS hash	1	128K	128K127753K	1	0	0	128K
NQNFS Lease	1	1K	1K127753K	1	0	0	1K
NFS daemon	1	1K	1K127753K	1	0	0	256
syncache	1	8K	8K127753K	1	0	0	8K
COS	353	44K	44K127753K	353	0	0	16,32,64,128
BPF	189	3K	3K127753K	189	0	0	16
MSDOSFS mount	1	64K	64K127753K	1	0	0	64K
NULLFS hash	1	1K	1K127753K	1	0	0	64
DEVFS mount	2	1K	1K127753K	2	0	0	16
DEVFS name	487	31K	31K127753K	487	0	0	64
DEVFS node	471	58K	58K127753K	479	0	0	16,128
vnodes	28	7K	7K127753K	429	0	0	16,32,64,128,256
mount	15	8K	8K127753K	18	0	0	16,128,512
cluster_save buffer	0	0K	1K127753K	55	0	0	32,64
vfscache	1898	376K	376K127753K	3228	0	0	64,128,256K
BIO buffer	49	98K	398K127753K	495	0	0	512,2K
pcb	159	16K	17K127753K	399	0	0	16,32,64,128,2K
soname	82	10K	10K127753K	42847	0	0	16,32,64,128
proc-args	57	2K	3K127753K	2105	0	0	16,32,64,128,256
ptys	32	16K	16K127753K	32	0	0	512
ttys	254	33K	33K127753K	522	0	0	128,512
kqueue	5	3K	4K127753K	23	0	0	256,1K
sigio	1	1K	1K127753K	27	0	0	32
file	383	24K	24K127753K	16060	0	0	64
file desc	76	19K	20K127753K	3968	0	0	256

shm	1	12K	12K127753K	1	0	0	16K
dev_t	286	36K	36K127753K	286	0	0	128
timecounter	10	2K	2K127753K	10	0	0	128
kld	11	117K	122K127753K	34	0	0	16,32,128,1K,4K
AR driver	1	1K	3K127753K	5	0	0	64,512,2K
AD driver	2	2K	3K127753K	2755	0	0	64,1K
Gzip trees	0	0K	46K127753K	133848	0	0	32,64,128,256
ISOFS node	1136	142K	142K127753K	1189	0	0	128
ISOFS mount	9	132K	132K127753K	10	0	0	512,128K
sem	3	6K	6K127753K	3	0	0	1K,4K
MD disk	2	2K	2K127753K	2	0	0	16,1K
msg	4	25K	25K127753K	4	0	0	512,4K,16K
rman	59	4K	4K127753K	461	0	0	16,64
ioctlops	0	0K	2K127753K	992	0	0	512,2K
taskqueue	2	1K	1K127753K	2	0	0	32
SWAP	2	413K	413K127753K	2	0	0	32,512K
ATA generic	6	3K	3K127753K	6	0	0	16,512
eventhandler	17	1K	1K127753K	17	0	0	32,64
bus	340	30K	31K127753K	794	0	0	16,32,64,128,256
sysctl	0	0K	1K127753K	130262	0	0	16,32,64
uidinfo	4	1K	1K127753K	10	0	0	32,128
cred	22	3K	3K127753K	3450	0	0	128
subproc	156	10K	10K127753K	7882	0	0	32,64,256
proc	2	1K	1K127753K	2	0	0	512
session	12	2K	2K127753K	34	0	0	128
pgrp	16	1K	1K127753K	45	0	0	32
ippool	1	1K	1K127753K	1	0	0	16
pfestat	0	0K	1K127753K	47349	0	0	16,32,64,512
pic	5	1K	1K127753K	5	0	0	64,128
lr	1	1K	1K127753K	1	0	0	512
itable32	110	4K	4K127753K	110	0	0	32
itable16	161	26K	26K127753K	161	0	0	128,256
ifstate	694	159K	160K127753K	1735	0	0	16,32,64,128,1K
pfe_ipc	0	0K	1K127753K	56218	0	0	16,32,64,128,1K
mkey	250	4K	4K127753K	824	0	0	16,32,64
ifaddr	9	1K	1K127753K	9	0	0	64
sysctl	0	0K	1K127753K	30	0	0	256
rtable	49	6K	6K127753K	307	0	0	16,32,64,128,512
ifmaddr	22	1K	1K127753K	22	0	0	16,32
ipfw	23	10K	10K127753K	48	0	0	16,32,64,512,2K
ifstat	698	805K	805K127753K	698	0	0	128,512,2K
rcache	4	8K	8K127753K	4	0	0	2K
rnode	27	1K	1K127753K	285	0	0	16,32
metrics	1	1K	1K127753K	3	0	0	128
rtnexthop	57	9K	9K127753K	312	0	0	32,128,256,512
iffamily	12	2K	2K127753K	12	0	0	128

Memory Totals: In Use Free Requests
 9311K 54K 489068

ITEM	SIZE	LIMIT	USED	FREE	REQUESTS
PIPE:	192,	0,	4,	81,	4422
SWAPMETA:	160,	95814,	0,	0,	0
unpcb:	160,	0,	114,	36,	279
ripcb:	192,	25330,	5,	37,	5
syncache:	128,	15359,	0,	64,	5
tcpcb:	576,	25330,	23,	12,	32
udpcb:	192,	25330,	14,	28,	255
socket:	256,	25330,	246,	26,	819
KNOTE:	96,	0,	27,	57,	71
NFSNODE:	352,	0,	0,	0,	0

```

NFSMOUNT:      544,      0,      0,      0,      0
VNODE:         224,      0,    2778,    43,    2778
NAMEI:        1024,      0,      0,      8,    40725
VMSPACE:       192,      0,     57,    71,    3906
PROC:         448,      0,     73,    17,    3923
DP fakepg:     64,      0,      0,      0,      0
PV ENTRY:      28,    499566,  44530, 152053, 1525141
MAP ENTRY:     48,      0,    1439,   134,  351075
KMAP ENTRY:    48,    35645,   179,   119,   10904
MAP:          108,      0,      7,      3,      7
VM OBJECT:     92,      0,    2575,   109,   66912

```

```

792644 cpu context switches
9863474 device interrupts
286510 software interrupts
390851 traps
3596829 system calls
    16 kernel threads created
    3880 fork() calls
    27 vfork() calls
    0 rfork() calls
    0 swap pager pageins
    0 swap pager pages paged in
    0 swap pager pageouts
    0 swap pager pages paged out
    380 vnode pager pageins
    395 vnode pager pages paged in
    122 vnode pager pageouts
    1476 vnode pager pages paged out
    0 page daemon wakeups
    0 pages examined by the page daemon
    101 pages reactivated
161722 copy-on-write faults
    0 copy-on-write optimized faults
    84623 zero fill pages zeroed
    83063 zero fill pages prezeroed
    7 intransit blocking page faults
535606 total VM faults taken
    0 pages affected by kernel thread creation
238254 pages affected by fork()
    2535 pages affected by vfork()
    0 pages affected by rfork()
283379 pages freed
    0 pages freed by daemon
190091 pages freed by exiting processes
17458 pages active
29166 pages inactive
    0 pages in VM cache
10395 pages wired down
134610 pages free
    4096 bytes per page
183419 total name lookups
    cache hits (90% pos + 7% neg) system 0% per-directory
    deletions 0%, falsehits 0%, toolong 0%

```

```

interrupt      total      rate
ata0 irq14      113338      3
mux irq7        727643     21
fxp1 irq10      1178671     34
sio0 irq4        833         0
clk irq0        3439769     99

```

```

rtc irq8          4403221      127
Total            9863475      286

```

```

Kernel direct memory map:
    4423 pages used
    4057340 pages maximum

```

Note: Kernel direct memory map only displays for 64 bit platform.

show system virtual-memory scc (TX Matrix Router)

```
user@host> show system virtual-memory scc
```

Memory statistics by bucket size

Size	In Use	Free	Requests	HighWater	Couldfree
16	898	126	749493	1280	0
32	2018	1310	980643	640	632
64	3490	13342	935420	320	5365

...

Memory usage type by bucket size

Size	Type(s)
16	uc_devlist, COS, BPF, DEVFS mount, DEVFS node, vnodes, mount, pcb, soname, rman, bus, sysctl, ifstate, pfe_ipc, mkey, socket, rtable, ifmaddr, ipfw, rnode, iftable, temp, devbuf, atexit, proc-args, kld, MD disk
32	atkbddev, Gzip trees, dirrem, mkdir, diradd, freefile, freefrag, indirdep, bmsafemap, newblk, tseg_qent, COS, vnodes,

...

Memory statistics by type

Type	InUse	MemUse	HighUse	Limit	Requests	Type	Kern	Limit	Limit	Size(s)
isadev	12	1K	1K166400K	12	0	0	0	64		
atkbddev	2	1K	1K166400K	2	0	0	0	32		
uc_devlist	24	3K	3K166400K	24	0	0	0	16,2K		

....

```

Memory Totals:  In Use      Free      Requests
                  6091K      1554K      2897122

```

show system virtual-memory sfc (TX Matrix Plus Router)

```
user@host> show system virtual-memory sfc 0
sfc0-re0:
```

```

-----
      Type InUse MemUse HighUse Requests  Size(s)
CAM dev queue      1      1K      -         1      64
  entropy    1024      64K      -       1024      64
    linker    487  6272K      -       1163  16,32,64,4096,32768,131072
      USB    127     10K      -        127  16,32,64,128,256,1024,2048
    lockf     46      3K      -      98418      64
    USBdev     10      2K      -         34  16,128,2048,16384
ifstateSLLNode      0      0K      -       1096      16
    devbuf  21243 15683K      -       21810
16,32,64,128,256,512,1024,2048,4096,8192,16384,32768,65536,131072
    temp    1283     151K      -    2483472
16,32,64,128,256,512,2048,4096,8192,16384,32768,65536,131072
    ip6ndp      0      0K      -          4      64
  in6ifmulti      1      1K      -          1      64
  in6grentry      1      1K      -          1      64
    iflogical    20      5K      -         29    2048
    iffamilly    45      6K      -         69  32,1024,2048
    rtnexthop   266     46K      -     608013  32,256,512,1024,2048,4096

```

```

metrics      31      4K      -      54  256
rnode       212      4K      -    607848 16,32
rcache        4      8K      -        4 65536
iflist        0      0K      -        6 16,64
ifdevice     11      8K      -        17 16,32768
ifstat      424    472K      -      427 512,16384,65536
ipfw         42     23K      -       145
16,32,64,128,256,512,1024,16384,32768,65536,131072
ifmaddr     415     11K      -      415 16,32
rtable      329     28K      -    608066 16,32,64,128,1024,16384
sysctl       0      0K      -    887976 16,32,64,4096,16384,32768
ifaddr       64      5K      -        70 32,64,128
mkey        331      6K      -    12528 16,128
pfe_ipc      0      0K      -   7299115
16,32,64,128,256,512,1024,2048,4096,8192,16384,32768,65536,131072
ifstate 1245054 70088K      -   3040437
16,32,64,128,256,512,1024,2048,4096,8192,16384,32768
idxbucket    1      1K      -        1 16
itable16   5069   1250K      -     5103 1024,4096
itable32    157     10K      -      157 64
itable64     2      1K      -        2 128
lr          1      1K      -        4 16384
pic         37      6K      -        37 64,16384
pfestat      0      0K      -     6220 32,64,128,256,131072
gencfg     1486   424K      -     2614 16,32,64,256,512,16384,32768,65536
jsr          2      1K      -        22 16
idl          1      4K      -       165
32,64,128,256,512,1024,2048,8192,16384,32768,65536,131072
rtsmsg       0      0K      -        16 131072
module      250     16K      -       250 64,128
mtx_pool     1      8K      -        1 64,128
DEVFS3      113     13K      -      114 256
DEVFS1      106     24K      -      106 2048
pgrp         15      1K      -     8600 64
session      11      2K      -     2829 512
proc         2      1K      -        2 16384
subproc     296   572K      -    24689 2048,131072
cred         38      5K      -    619244 256
plimit       18      4K      -    21311 2048
uidinfo       3      1K      -        10 32,512
sysctlloid  2701     82K      -     2701 16,32,64
sysctltmp    0      0K      -    15572 16,32,64,1024
umtx        171     11K      -      171 64
SWAP         2    277K      -        2 64
bus         779    125K      -     3072 16,32,64,128,32768
bus-sc       67     62K      -     1477
16,32,64,512,1024,2048,8192,16384,65536,131072
devstat      8     17K      -        8 16,131072
eventhandler 46      2K      -        47 32,128
kobj         93    186K      -      111 65536
DEVFS        8      1K      -        9 16,64
rman        106      7K      -      490 16,32,64
sbuf         0      0K      -    28234 16,32,32768,131072
...
lcc0-re0:
-----
Type InUse MemUse HighUse Requests Size(s)
CAM dev queue 1      1K      -        1 64
entropy 1024     64K      -     1024 64
linker  487    6272K      -     1163 16,32,64,4096,32768,131072
USB     127     10K      -      127 16,32,64,128,256,1024,2048

```

lockf	23	2K	-	169585	64
USBdev	10	2K	-	34	16,128,2048,16384
devbuf	5128	10760K	-	5310	
16,32,64,128,256,512,1024,2048,4096,8192,16384,32768,65536,131072					
temp	1285	151K	-	10770	
16,32,64,128,256,512,2048,4096,8192,16384,32768,65536,131072					
ip6ndp	0	0K	-	4	64
iflogical	20	5K	-	29	2048
iffamily	45	6K	-	69	32,1024,2048
rtnexthop	189	29K	-	1211988	32,256,512,1024,2048,4096
metrics	11	2K	-	16	256
rnode	135	3K	-	606391	16,32
rcache	4	8K	-	4	65536
iflist	0	0K	-	6	16,64
ifdevice	11	8K	-	17	16,32768
ifstat	412	471K	-	415	512,16384,65536
ipfw	42	23K	-	91	
16,32,64,128,256,512,1024,16384,32768,65536,131072					
ifmaddr	415	11K	-	415	16,32
rtable	225	20K	-	606584	16,32,64,128,1024,16384
sysctl	0	0K	-	2302479	16,32,64
ifaddr	53	4K	-	69	32,64,128
mkey	133	3K	-	8974	16,128
pfe_ipc	0	0K	-	19035108	
16,32,64,128,512,1024,2048,8192,16384,32768,65536,131072					
ifstate	710270	42176K	-	9583703	
16,32,64,128,256,512,1024,2048,8192,16384,32768					
idxbucket	1	1K	-	1	16
itable16	5045	1245K	-	1825178	1024,4096
itable32	157	10K	-	157	64
itable64	2	1K	-	2	128
lr	1	1K	-	4	16384
pic	37	6K	-	37	64,16384
pfestat	0	0K	-	1682	32,64,128,256,131072
gencfg	1486	424K	-	2812	16,32,64,256,512,16384,32768,65536
jsr	0	0K	-	22	16
idl	0	0K	-	4	32768,131072
rtsmg	0	0K	-	3	131072
module	250	16K	-	250	64,128
mtx_pool	1	8K	-	1	64,128
DEVFS3	108	12K	-	109	256
DEVFS1	101	23K	-	101	2048
pgrp	5	1K	-	917	64
session	5	1K	-	917	512
proc	2	1K	-	2	16384
subproc	217	441K	-	4867	2048,131072
cred	21	3K	-	48719	256
plimit	9	2K	-	5255	2048
uidinfo	2	1K	-	2	32,512
sysctlloid	2786	85K	-	2786	16,32,64
sysctltmp	0	0K	-	1833	16,32,64,1024
umtx	126	8K	-	126	64
SWAP	2	277K	-	2	64
bus	780	125K	-	2734	16,32,64,128,32768
bus-sc	69	69K	-	1194	
16,32,64,512,1024,2048,8192,16384,65536,131072					
devstat	8	17K	-	8	16,131072
eventhandler	45	2K	-	46	32,128
kobj	93	186K	-	111	65536
DEVFS	8	1K	-	9	16,64
rman	94	6K	-	477	16,32,64

sbuf	0	OK	-	532	16,32,32768,131072
NULLFS hash	1	1K	-	1	64
taskqueue	5	1K	-	5	64
turnstiles	127	8K	-	127	64
Unitno	6	1K	-	44	16,64
ioctlops	0	OK	-	1771718	16,32,64,128,8192,16384,65536,131072
iov	0	OK	-	79425	16,64,128,256,512,1024,2048,131072
msg	4	25K	-	4	32768,131072
sem	4	7K	-	4	16384,32768,131072
shm	2	13K	-	4	32768
ttys	93	16K	-	195	512,32768
soname	31	3K	-	389284	16,32,64,256
pcb	101	16K	-	4374	
16,32,64,128,1024,2048,4096,16384,65536					
BIO buffer	40	80K	-	750	65536
vfscache	1	512K	-	1	65536
cluster_save buffer	0	OK	-	-	55 32,64
VFS hash	1	256K	-	1	32,64
vnodes	1	1K	-	1	512
mount	266	21K	-	481	16,32,64,128,256,4096,32768
vnodemarker	0	OK	-	2497	16384
pfs_nodes	25	3K	-	25	128
pfs_vncache	144	5K	-	386	32
STP	1	1K	-	1	64
GEOM	173	15K	-	1068	
16,32,64,128,256,512,2048,16384,32768,131072					
synccache	1	8K	-	1	
16,32,64,128,256,512,2048,16384,32768,131072					
tlv_stat	0	OK	-	223	
16,32,64,128,256,512,2048,16384,32768,131072					
NFS daemon	1	8K	-	1	
16,32,64,128,256,512,2048,16384,32768,131072					
p1003.1b	1	1K	-	1	16
MD disk	9	18K	-	9	65536
ata_generic	2	2K	-	25	16,16384,32768
ISOFS mount	7	1K	-	13	512
ISOFS node	1439	135K	-	1453	128
CAM SIM	1	1K	-	1	64
CAM XPT	6	1K	-	9	16,64,16384
CAM periph	1	1K	-	1	128
ad_driver	2	1K	-	2	256
pagedep	1	64K	-	105	64
inodedep	1	256K	-	552	256
newblk	1	1K	-	327	64,4096
bmsafemap	0	OK	-	19	64
allocdirect	0	OK	-	326	128
freefrag	0	OK	-	31	32
freeblks	0	OK	-	103	2048
freefile	0	OK	-	175	32
diradd	0	OK	-	590	64
mkdir	0	OK	-	166	32
dirrem	0	OK	-	382	32
savedino	0	OK	-	283	512
UFS mount	15	36K	-	15	2048,65536,131072
ata_dma	6	1K	-	6	256
UMAHash	1	4K	-	5	4096,16384,32768,65536,131072
cdev	26	3K	-	26	256
file desc	111	25K	-	5199	16,1024,2048,16384
VM pgdata	2	65K	-	2	64
sigio	1	1K	-	27	32

kenv	30	5K	-	33	16,32,64,131072
atkbddev	2	1K	-	2	32
kqueue	0	0K	-	88	1024,4096,32768
proc-args	28	2K	-	3970	32,64,128,256,512,1024
isadev	23	2K	-	23	64
zombie	1	1K	-	4651	128
ithread	92	7K	-	92	16,64,256
legacydrv	3	1K	-	3	16
memdesc	1	4K	-	1	131072
nexusdev	2	1K	-	2	16
CAM queue	3	1K	-	3	16
KTRACE	100	10K	-	100	128
kbdmux	5	9K	-	5	128,2048,65536,131072
ITEM	SIZE	LIMIT	USED	FREE	REQUESTS
UMA Kgs:	136,	0,	71,	1,	71
...					

show system
virtual-memory |
display xml

```

user@host> show system virtual-memory | display xml
<rpc-reply xmlns:junos="http://xml.juniper.net/junos/10.2R1/junos">
  <system-virtual-memory-information>
    <vmstat-memstat-malloc>
      <memstat-name>CAM dev queue</memstat-name>
      <inuse>1</inuse>
      <memuse>1</memuse>
      <high-use>-</high-use>
      <memstat-req>1</memstat-req>
      <memstat-size>64</memstat-size>
      <memstat-name>entropy</memstat-name>
      <inuse>1024</inuse>
      <memuse>64</memuse>
      <high-use>-</high-use>
      <memstat-req>1024</memstat-req>
      <memstat-size>64</memstat-size>
      <memstat-name>linker</memstat-name>
      <inuse>481</inuse>
      <memuse>1871</memuse>
      <high-use>-</high-use>
      <memstat-req>1145</memstat-req>
      <memstat-size>16,32,64,4096,32768,131072</memstat-size>
      <memstat-name>lockf</memstat-name>
      <inuse>56</inuse>
      <memuse>4</memuse>
      <high-use>-</high-use>
      <memstat-req>5998</memstat-req>
      <memstat-size>64</memstat-size>
      <memstat-name>devbuf</memstat-name>
      <inuse>2094</inuse>
      <memuse>3877</memuse>
      <high-use>-</high-use>
      <memstat-req>2099</memstat-req>

      <memstat-size>16,32,64,128,512,1024,4096,8192,16384,32768,65536,131072</memstat-size>

      <memstat-name>temp</memstat-name>
      <inuse>21</inuse>
      <memuse>66</memuse>
      <high-use>-</high-use>
      <memstat-req>3127</memstat-req>

      <memstat-size>16,32,64,128,256,512,2048,4096,8192,16384,32768,65536,131072</memstat-size>

```



```

<memstat-name>ip6ndp</memstat-name>
<inuse>0</inuse>
<memuse>0</memuse>
<high-use>--</high-use>
<memstat-req>4</memstat-req>
<memstat-size>64</memstat-size>
<memstat-name>in6ifmulti</memstat-name>
<inuse>1</inuse>
<memuse>1</memuse>
<high-use>--</high-use>
<memstat-req>1</memstat-req>
<memstat-size>64</memstat-size>
<memstat-name>in6grentry</memstat-name>
<inuse>1</inuse>
<memuse>1</memuse>
<high-use>--</high-use>
<memstat-req>1</memstat-req>
<memstat-size>64</memstat-size>
<memstat-name>iflogical</memstat-name>
<inuse>13</inuse>
<memuse>3</memuse>
<high-use>--</high-use>
<memstat-req>13</memstat-req>
<memstat-size>64,2048</memstat-size>
<memstat-name>iffamily</memstat-name>
<inuse>28</inuse>
<memuse>4</memuse>
<high-use>--</high-use>
<memstat-req>28</memstat-req>
<memstat-size>32,1024,2048</memstat-size>
<memstat-name>rtnextthop</memstat-name>
<inuse>127</inuse>
<memuse>18</memuse>
<high-use>--</high-use>
<memstat-req>129</memstat-req>
<memstat-size>32,256,512,1024,2048,4096</memstat-size>
<memstat-name>metrics</memstat-name>
<inuse>3</inuse>
<memuse>1</memuse>
<high-use>--</high-use>
<memstat-req>5</memstat-req>
<memstat-size>256</memstat-size>
<memstat-name>inifmulti</memstat-name>
<inuse>3</inuse>
<memuse>1</memuse>
<high-use>--</high-use>
<memstat-req>3</memstat-req>
<memstat-size>64</memstat-size>
<memstat-name>ingrentry</memstat-name>
<inuse>6</inuse>
<memuse>1</memuse>
<high-use>--</high-use>
<memstat-req>6</memstat-req>
<memstat-size>64</memstat-size>
<memstat-name>rnode</memstat-name>
<inuse>68</inuse>
<memuse>2</memuse>
<high-use>--</high-use>
<memstat-req>76</memstat-req>
<memstat-size>16,32</memstat-size>
<memstat-name>rcache</memstat-name>

```

```
<inuse>4</inuse>
<memuse>8</memuse>
<high-use>--</high-use>
<memstat-req>4</memstat-req>
<memstat-size>65536</memstat-size>
<memstat-name>ifdevice</memstat-name>
<inuse>4</inuse>
<memuse>1</memuse>
<high-use>--</high-use>
<memstat-req>4</memstat-req>
<memstat-size>16</memstat-size>
<memstat-name>ifstat</memstat-name>
<inuse>40</inuse>
<memuse>22</memuse>
<high-use>--</high-use>
<memstat-req>40</memstat-req>
<memstat-size>512,16384,32768</memstat-size>
<memstat-name>ipfw</memstat-name>
<inuse>42</inuse>
<memuse>23</memuse>
<high-use>--</high-use>
<memstat-req>91</memstat-req>

<memstat-size>16,32,64,128,256,512,1024,16384,32768,65536,131072</memstat-size>
<memstat-name>ifmaddr</memstat-name>
<inuse>103</inuse>
<memuse>3</memuse>
<high-use>--</high-use>
<memstat-req>103</memstat-req>
<memstat-size>16,32</memstat-size>
<memstat-name>rtable</memstat-name>
<inuse>129</inuse>
<memuse>14</memuse>
<high-use>--</high-use>
<memstat-req>139</memstat-req>
<memstat-size>16,32,64,128,1024,16384</memstat-size>
<memstat-name>sysctl</memstat-name>
<inuse>0</inuse>
<memuse>0</memuse>
<high-use>--</high-use>
<memstat-req>14847</memstat-req>
<memstat-size>16,32,64,4096,16384,32768</memstat-size>
<memstat-name>ifaddr</memstat-name>
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<memuse>3</memuse>
<high-use>--</high-use>
<memstat-req>29</memstat-req>
<memstat-size>64,128</memstat-size>
<memstat-name>mkey</memstat-name>
<inuse>345</inuse>
<memuse>6</memuse>
<high-use>--</high-use>
<memstat-req>2527</memstat-req>
<memstat-size>16,128</memstat-size>
<memstat-name>pfe_ipc</memstat-name>
<inuse>0</inuse>
<memuse>0</memuse>
<high-use>--</high-use>
<memstat-req>1422</memstat-req>

<memstat-size>16,32,64,128,512,1024,2048,8192,16384,32768,65536,131072</memstat-size>
```

```

    <memstat-name>ifstate</memstat-name>
    <inuse>594</inuse>
    <memuse>51</memuse>
    <high-use>--</high-use>
    <memstat-req>655</memstat-req>

<memstat-size>16,32,64,128,256,1024,2048,4096,16384,32768</memstat-size>
    <memstat-name>itable16</memstat-name>
    <inuse>276</inuse>
    <memuse>52</memuse>
    <high-use>--</high-use>
    <memstat-req>294</memstat-req>
    <memstat-size>1024,4096</memstat-size>
    <memstat-name>itable32</memstat-name>
    <inuse>160</inuse>
    <memuse>10</memuse>
    <high-use>--</high-use>
    <memstat-req>160</memstat-req>
    <memstat-size>64</memstat-size>
    <memstat-name>itable64</memstat-name>
    <inuse>2</inuse>
    <memuse>1</memuse>
    <high-use>--</high-use>
    <memstat-req>2</memstat-req>
    <memstat-size>128</memstat-size>
    <memstat-name>lr</memstat-name>
    <inuse>1</inuse>
    <memuse>1</memuse>
    <high-use>--</high-use>
    <memstat-req>1</memstat-req>
    <memstat-size>16384</memstat-size>
    <memstat-name>pic</memstat-name>
    <inuse>5</inuse>
    <memuse>1</memuse>
    <high-use>--</high-use>
    <memstat-req>5</memstat-req>
    <memstat-size>64,512</memstat-size>
    <memstat-name>pfestat</memstat-name>
    <inuse>0</inuse>
    <memuse>0</memuse>
    <high-use>--</high-use>
    <memstat-req>162</memstat-req>
    <memstat-size>16,32,128,256,16384</memstat-size>
    <memstat-name>gencfg</memstat-name>
    <inuse>224</inuse>
    <memuse>56</memuse>
    <high-use>--</high-use>
    <memstat-req>540</memstat-req>
    <memstat-size>16,32,64,256,512,32768,65536</memstat-size>
    <memstat-name>jsr</memstat-name>
    <inuse>2</inuse>
    <memuse>1</memuse>
    <high-use>--</high-use>
    <memstat-req>4</memstat-req>
    <memstat-size>16</memstat-size>
    <memstat-name>idl</memstat-name>
    <inuse>0</inuse>
    <memuse>0</memuse>
    <high-use>--</high-use>
    <memstat-req>13</memstat-req>

```

```
<memstat-size>16,32,64,128,256,4096,16384,32768,131072</memstat-size>
```

```
<memstat-name>rtsmg</memstat-name>
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<memuse>0</memuse>
<high-use>--</high-use>
<memstat-req>2</memstat-req>
<memstat-size>131072</memstat-size>
<memstat-name>module</memstat-name>
<inuse>249</inuse>
<memuse>16</memuse>
<high-use>--</high-use>
<memstat-req>249</memstat-req>
<memstat-size>64,128</memstat-size>
<memstat-name>mtx_pool</memstat-name>
<inuse>1</inuse>
<memuse>8</memuse>
<high-use>--</high-use>
<memstat-req>1</memstat-req>
<memstat-size>64,128</memstat-size>
<memstat-name>DEVFS3</memstat-name>
<inuse>109</inuse>
<memuse>12</memuse>
<high-use>--</high-use>
<memstat-req>117</memstat-req>
<memstat-size>256</memstat-size>
<memstat-name>DEVFS1</memstat-name>
<inuse>102</inuse>
<memuse>23</memuse>
<high-use>--</high-use>
<memstat-req>109</memstat-req>
<memstat-size>2048</memstat-size>
<memstat-name>pgrp</memstat-name>
<inuse>12</inuse>
<memuse>1</memuse>
<high-use>--</high-use>
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<memstat-size>64</memstat-size>
<memstat-name>session</memstat-name>
<inuse>8</inuse>
<memuse>1</memuse>
<high-use>--</high-use>
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<memstat-size>512</memstat-size>
<memstat-name>proc</memstat-name>
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<memuse>1</memuse>
<high-use>--</high-use>
<memstat-req>2</memstat-req>
<memstat-size>16384</memstat-size>
<memstat-name>subproc</memstat-name>
<inuse>244</inuse>
<memuse>496</memuse>
<high-use>--</high-use>
<memstat-req>1522</memstat-req>
<memstat-size>2048,131072</memstat-size>
<memstat-name>cred</memstat-name>
<inuse>30</inuse>
<memuse>4</memuse>
<high-use>--</high-use>
<memstat-req>11409</memstat-req>
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```

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<inuse>17</inuse>
<memuse>4</memuse>
<high-use>--</high-use>
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<memstat-size>2048</memstat-size>
<memstat-name>uidinfo</memstat-name>
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<memuse>1</memuse>
<high-use>--</high-use>
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<memstat-size>32,512</memstat-size>
<memstat-name>sysctlpid</memstat-name>
<inuse>1117</inuse>
<memuse>34</memuse>
<high-use>--</high-use>
<memstat-req>1117</memstat-req>
<memstat-size>16,32,64</memstat-size>
<memstat-name>sysctltmp</memstat-name>
<inuse>0</inuse>
<memuse>0</memuse>
<high-use>--</high-use>
<memstat-req>743</memstat-req>
<memstat-size>16,32,64,1024</memstat-size>
<memstat-name>umtx</memstat-name>
<inuse>144</inuse>
<memuse>9</memuse>
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<memstat-req>144</memstat-req>
<memstat-size>64</memstat-size>
<memstat-name>SWAP</memstat-name>
<inuse>2</inuse>
<memuse>209</memuse>
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<memstat-req>2</memstat-req>
<memstat-size>64</memstat-size>
<memstat-name>bus</memstat-name>
<inuse>496</inuse>
<memuse>55</memuse>
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<memstat-name>bus-sc</memstat-name>
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<memuse>33</memuse>
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<memstat-name>devstat</memstat-name>
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<memuse>21</memuse>
<high-use>--</high-use>
<memstat-req>10</memstat-req>
<memstat-size>16,131072</memstat-size>
<memstat-name>eventhandler</memstat-name>
<inuse>35</inuse>
<memuse>2</memuse>
<high-use>--</high-use>
<memstat-req>36</memstat-req>

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<memstat-size>32,128</memstat-size>
<memstat-name>kobj</memstat-name>
<inuse>93</inuse>
<memuse>186</memuse>
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```

```
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```

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```

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<free>25</free>
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<zone-size>291</zone-size>
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```

```
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<free>0</free>
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<zone-size>460</zone-size>
<count-limit>0</count-limit>
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<free>0</free>
<zone-req>0</zone-req>
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<zone-size>404</zone-size>
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<free>9</free>
<zone-req>717</zone-req>
<zone-name>KNOTE:</zone-name>
<zone-size>72</zone-size>
<count-limit>0</count-limit>
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<zone-name>socket:</zone-name>
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<count-limit>25191</count-limit>
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<zone-name>unpcb:</zone-name>
<zone-size>140</zone-size>
<count-limit>25200</count-limit>
<used>170</used>
<free>26</free>
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<zone-name>ipq:</zone-name>
<zone-size>52</zone-size>
<count-limit>216</count-limit>
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<free>0</free>
<zone-req>0</zone-req>
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<count-limit>25194</count-limit>
<used>19</used>
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<zone-name>inpcb:</zone-name>
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```

```
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<zone-size>128</zone-size>
<count-limit>15360</count-limit>
<used>0</used>
<free>60</free>
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<zone-name>tcpreass:</zone-name>
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<count-limit>1690</count-limit>
<used>0</used>
<free>0</free>
<zone-req>0</zone-req>
<zone-name>sackhole:</zone-name>
<zone-size>20</zone-size>
<count-limit>0</count-limit>
<used>0</used>
<free>0</free>
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<free>29</free>
<zone-req>5</zone-req>
<zone-name>SWAPMETA:</zone-name>
<zone-size>276</zone-size>
<count-limit>94948</count-limit>
<used>0</used>
<free>0</free>
<zone-req>0</zone-req>
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<zone-size>132</zone-size>
<count-limit>0</count-limit>
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<count-limit>0</count-limit>
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  <cpu-context-switch>934906</cpu-context-switch>
  <dev-intr>1707986</dev-intr>
  <soft-intr>33819</soft-intr>
  <traps>203604</traps>
  <sys-calls>1200636</sys-calls>
```

```

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<pages-affected-by-rfork>0</pages-affected-by-rfork>
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  <intr-cnt>1243455</intr-cnt>
  <intr-rate>999</intr-rate>
  <intr-name>irq4: sio0     </intr-name>
  <intr-cnt>1140</intr-cnt>
  <intr-rate>0</intr-rate>
  <intr-name>irq8: rtc      </intr-name>
  <intr-cnt>159164</intr-cnt>
  <intr-rate>127</intr-rate>
  <intr-name>irq9: cbb1 fxp0 </intr-name>
  <intr-cnt>28490</intr-cnt>
  <intr-rate>22</intr-rate>
  <intr-name>irq10: fxp1    </intr-name>
  <intr-cnt>20593</intr-cnt>
  <intr-rate>16</intr-rate>

```

```

        <intr-name>irq14: ata0          </intr-name>
        <intr-cnt>5031</intr-cnt>
        <intr-rate>4</intr-rate>
        <intr-name>Total</intr-name>
        <intr-cnt>1457873</intr-cnt>
        <intr-rate>1171</intr-rate>
    </vmstat-intr>
    <vm-kernel-state>
        <vm-kmem-map-free>248524800</vm-kmem-map-free>
    </vm-kernel-state>
    <kernel-direct-mm-size-information>
        <vm-directmm-size-used>4644</vm-directmm-size-used>
        <vm-directmm-size-max>4057334</vm-directmm-size-max>
    </kernel-direct-mm-size-information>
</system-virtual-memory-information>
<cli>
    <banner></banner>
</cli>
</rpc-reply>

```

Note: <kernel-direct-mm-size-information> only displays for 64 bit platform.

show system virtual-memory (QFX Series)

```

user@switch> show system virtual-memory | display xml
<rpc-reply xmlns:junos="http://xml.juniper.net/junos/11.1R1/junos">
  <system-virtual-memory-information>
    <vmstat-memstat-malloc>
      <memstat-name>CAM dev queue</memstat-name>
      <inuse>1</inuse>
      <memuse>1</memuse>
      <high-use>-</high-use>
      <memstat-req>1</memstat-req>
      <memstat-size>64</memstat-size>
      <memstat-name>entropy</memstat-name>
      <inuse>1024</inuse>
      <memuse>64</memuse>
      <high-use>-</high-use>
      <memstat-req>1024</memstat-req>
      <memstat-size>64</memstat-size>
      <memstat-name>linker</memstat-name>
      <inuse>481</inuse>
      <memuse>1871</memuse>
      <high-use>-</high-use>
      <memstat-req>1145</memstat-req>
      <memstat-size>16,32,64,4096,32768,131072</memstat-size>
      <memstat-name>lockf</memstat-name>
      <inuse>56</inuse>
      <memuse>4</memuse>
      <high-use>-</high-use>
      <memstat-req>5998</memstat-req>
      <memstat-size>64</memstat-size>
      <memstat-name>devbuf</memstat-name>
      <inuse>2094</inuse>
      <memuse>3877</memuse>
      <high-use>-</high-use>
      <memstat-req>2099</memstat-req>

      <memstat-size>16,32,64,128,512,1024,4096,8192,16384,32768,65536,131072</memstat-size>

      <memstat-name>temp</memstat-name>
      <inuse>21</inuse>
      <memuse>66</memuse>
    </vmstat-memstat-malloc>
  </system-virtual-memory-information>
</rpc-reply>

```

```

<high-use>--</high-use>
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<memuse>0</memuse>
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<memstat-name>in6ifmulti</memstat-name>
<inuse>1</inuse>
<memuse>1</memuse>
<high-use>--</high-use>
<memstat-req>1</memstat-req>
<memstat-size>64</memstat-size>
<memstat-name>in6grentry</memstat-name>
<inuse>1</inuse>
<memuse>1</memuse>
<high-use>--</high-use>
<memstat-req>1</memstat-req>
<memstat-size>64</memstat-size>
<memstat-name>iflogical</memstat-name>
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<memuse>3</memuse>
<high-use>--</high-use>
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<memstat-size>64,2048</memstat-size>
<memstat-name>iffamily</memstat-name>
<inuse>28</inuse>
<memuse>4</memuse>
<high-use>--</high-use>
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<memstat-name>rtnexthop</memstat-name>
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<memstat-name>inifmulti</memstat-name>
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<memuse>1</memuse>
<high-use>--</high-use>
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<memstat-name>ingrentry</memstat-name>
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<memuse>1</memuse>
<high-use>--</high-use>
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<memstat-size>64</memstat-size>
<memstat-name>rnode</memstat-name>
<inuse>68</inuse>

```

```

<memuse>2</memuse>
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<memstat-name>rcache</memstat-name>
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<memstat-name>ifdevice</memstat-name>
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<memuse>1</memuse>
<high-use>--</high-use>
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<memstat-name>ifstat</memstat-name>
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```



```

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<memstat-name>jsr</memstat-name>
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```

```
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```

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<memstat-name>module</memstat-name>
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<memuse>16</memuse>
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<memstat-name>mtx_pool</memstat-name>
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<memstat-name>DEVFS3</memstat-name>
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<memstat-name>pgrp</memstat-name>
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<memstat-name>subproc</memstat-name>
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```

```

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<memstat-name>sysctluid</memstat-name>
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<memstat-req>1117</memstat-req>
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<memstat-name>sysctltmp</memstat-name>
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<memstat-name>umtx</memstat-name>
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```

```
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<memstat-req>111</memstat-req>
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<memstat-name>DEVFS</memstat-name>
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<memstat-name>rman</memstat-name>
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<memstat-name>turnstiles</memstat-name>
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<memuse>0</memuse>
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```

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<memstat-name>msg</memstat-name>
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<memstat-name>sem</memstat-name>
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<memstat-req>4</memstat-req>
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<memstat-name>shm</memstat-name>
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<high-use>--</high-use>
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<memstat-size>32768</memstat-size>
<memstat-name>ttys</memstat-name>
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```

```

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<high-use>--</high-use>
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<memstat-name>VFS hash</memstat-name>
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<memuse>11</memuse>
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```

```

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<memstat-name>ata_generic</memstat-name>
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<memstat-name>ISofs mount</memstat-name>
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<memstat-req>9</memstat-req>

```

```
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<memstat-name>ad_driver</memstat-name>
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<memstat-name>inodedep</memstat-name>
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<memstat-name>allocindir</memstat-name>
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```



```

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<memstat-name>UMAHash</memstat-name>
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<memstat-name>cdev</memstat-name>

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<memstat-name>VM_pgdata</memstat-name>
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<memuse>1</memuse>
<high-use>--</high-use>
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<memstat-name>kenv</memstat-name>
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<memstat-name>atkbddev</memstat-name>
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<memstat-name>kqueue</memstat-name>
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```

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<memuse>1</memuse>
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<memuse>9</memuse>
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```

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```

```

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```

```
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<count-limit>0</count-limit>
<used>665</used>
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```

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<zone-req>5976</zone-req>
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```

```
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<zone-size>291</zone-size>
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<zone-req>63</zone-req>
```



```
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<count-limit>0</count-limit>
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<used>19</used>
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<zone-req>31</zone-req>
<zone-name>inpcb:</zone-name>
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<count-limit>25194</count-limit>
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<free>28</free>
<zone-req>105</zone-req>
<zone-name>tcpcb:</zone-name>
```

```
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<free>0</free>
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<zone-size>256</zone-size>
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<vmstat-sumstat>
```

```

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<soft-intr>33819</soft-intr>
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<negative-cache-hits>5</negative-cache-hits>
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<cache-deletions>0</cache-deletions>
<cache-falsehits>0</cache-falsehits>
<toolong>0</toolong>
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  <intr-cnt>1243455</intr-cnt>
  <intr-rate>999</intr-rate>
  <intr-name>irq4: sio0     </intr-name>
  <intr-cnt>1140</intr-cnt>
  <intr-rate>0</intr-rate>
  <intr-name>irq8: rtc      </intr-name>
  <intr-cnt>159164</intr-cnt>
  <intr-rate>127</intr-rate>
  <intr-name>irq9: cbb1 fxp0 </intr-name>

```

```
<intr-cnt>28490</intr-cnt>
<intr-rate>22</intr-rate>
<intr-name>irq10: fxp1      </intr-name>
<intr-cnt>20593</intr-cnt>
<intr-rate>16</intr-rate>
<intr-name>irq14: ata0     </intr-name>
<intr-cnt>5031</intr-cnt>
<intr-rate>4</intr-rate>
<intr-name>Total</intr-name>
<intr-cnt>1457873</intr-cnt>
<intr-rate>1171</intr-rate>
</vmstat-intr>
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</vm-kernel-state>
</system-virtual-memory-information>
<cli>
  <banner></banner>
</cli>
</rpc-reply>
```

show task

Syntax	<pre>show task <logical-system (all <i>logical-system-name</i>)> <summary> <task-name> io memory replication snooping</pre>
Release Information	Command introduced before Junos OS Release 7.4.
Description	Display routing protocol tasks on the Routing Engine.
Options	<p>none—Display all routing protocol tasks on the Routing Engine.</p> <p>logical-system (all <i>logical-system-name</i>)—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> <p>summary—(Optional) Display summary information about running tasks.</p> <p>task-name—(Optional) Display information about running tasks for all tasks whose name begins with this string (for example, BGP_Group_69_153 and BGP_Group_70_153 are both displayed when you run the show task BGP_Group command).</p> <p>io—Show i/o statistics for all tasks displayed.</p> <p>memory—Show memory statistics for all tasks displayed.</p> <p>replication—Show only replication tasks.</p> <p>snooping—Show only snooping tasks.</p>
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> • show task io on page 421 • show task memory on page 423
List of Sample Output	show task on page 420
Output Fields	Table 16 on page 419 describes the output fields for the show task command. Output fields are listed in the approximate order in which they appear.

Table 16: show task Output Fields

Field Name	Field Description
Pri	Current priority of the process. A lower number indicates a higher priority.
Task Name	Name of the task.

Table 16: show task Output Fields (*continued*)

Field Name	Field Description
Pro	IP protocol number associated with the process.
Port	TCP or UDP port number associated with the task.
So	Socket number of the task.
Flags	Flags for the task: <ul style="list-style-type: none"> • Accept—Task is waiting for incoming connections. • Connect—Task is waiting for a connection to be completed. • Delete—Task has been deleted and is being cleaned up. • LowPrio—Task will be dispatched to read its socket after other higher-priority tasks.

Sample Output

show task

```

user@host> show task
Pri Task Name                Pro  Port  So  Flags
10 IF
15 LABEL
15 ISO
15 INET                      7
20 Aggregate
20 RT
30 ICMP                      1    9
39 ISIS I/O                  12
40 IS-IS                     10
40 BGP RT Background         <LowPrio>
40 BGP.0.0.0.0+179           179 15 <Accept LowPrio>
50 BGP_69.192.168.201.234+179 179 17 <LowPrio>
50 BGP_70.192.168.201.233+179 179 16 <LowPrio>
50 BGP_Group_69_153          <LowPrio>
50 BGP_Group_70_153          <LowPrio>
50 ASPaths
60 KRT                       255   1
60 Redirect
70 MGMT.local                14 <LowPrio>
70 MGMT_Listen./var/run/rpd_mgmt 13 <Accept LowPrio>
70 SNMP Subagent./var/run/sub_rpd.sock 8 <LowPrio>

```

show task io

Syntax	show task io <logical-system (all <i>logical-system-name</i>)>
Syntax (EX Series Switches)	show task io
Release Information	Command introduced before Junos OS Release 7.4. Command introduced in Junos OS Release 9.0 for EX Series switches.
Description	Display I/O statistics for routing protocol tasks on the Routing Engine.
Options	none —Display I/O statistics for routing protocol tasks on the Routing Engine. logical-system (all <i>logical-system-name</i>) —(Optional) Perform this operation on all logical systems or on a particular logical system.
Required Privilege Level	view
List of Sample Output	show task io on page 422
Output Fields	Table 17 on page 421 describes the output fields for the show task io command. Output fields are listed in the approximate order in which they appear.

Table 17: show task io Output Fields

Field Name	Field Description
Task Name	Name of the task.
Reads	Number of input ready notifications.
Writes	Number of output ready notifications.
Rcvd	Number of requests to the kernel for input.
Sent	Number of requests to the kernel for output.
Dropped	Number of sent requests that failed.

Sample Output

show task io

```
user@host> show task io
```

Task Name	Reads	Writes	Rcvd	Sent	Dropped
LMP Client	1	1	0	0	0
IF	0	0	0	0	0
INET6	0	0	0	0	0
INET	0	0	0	0	0
ISO	0	0	0	0	0
Memory	0	0	0	0	0
RPD Unix Domain Server./var/ru	0	0	0	0	0
RPD Unix Domain Server./var/ru	1	0	0	0	0
RPD Unix Domain Server./var/ru	2	0	0	0	0
RPD Server.0.0.0.0+666	0	0	0	0	0
Aggregate	0	0	0	0	0
RT	0	0	0	0	0
ICMP	0	0	0	0	0
Router-Advertisement	0	0	0	0	0
ICMPv6	0	0	0	0	0
IS-IS I/O./var/run/ppmd_contro	1307	1	0	0	0
l2vpn global task	0	0	0	0	0
IS-IS	0	0	0	0	0
BFD I/O./var/run/bfdd_control	1307	1	0	0	0
TED	0	0	0	0	0
ASPaths	0	0	0	0	0
Resolve tree 1	0	0	0	0	0
KStat	0	0	0	0	0
KRT Request	0	0	63	0	0
KRT Ifstate	106	0	295	0	0
KRT	0	0	0	0	0
Redirect	0	0	0	0	0
...					

show task memory

Syntax	show task memory <brief detail history summary> <logical-system (all <i>logical-system-name</i>)>
Syntax (EX Series Switches)	show task memory <brief detail history summary>
Release Information	Command introduced before Junos OS Release 7.4. Command introduced in Junos OS Release 9.0 for EX Series switches.
Description	Display memory utilization for routing protocol tasks on the Routing Engine.
Options	<p>none—Display standard information about memory utilization for routing protocol tasks on the Routing Engine on all logical systems.</p> <p>brief detail history summary—(Optional) Display the specified level of output. Use the history option to display a history of memory utilization information.</p> <p>logical-system (all <i>logical-system-name</i>)—(Optional) Perform this operation on all logical systems or on a particular logical system.</p>
Required Privilege Level	view
List of Sample Output	show task memory on page 425 show task memory detail on page 425
Output Fields	<p>Table 18 on page 423 describes the output fields for the show task memory command. Output fields are listed in the approximate order in which they appear.</p>

Table 18: show task memory Output Fields

Field Name	Field Description	Level of Output
Memory Currently In Use	Memory currently in use.	All levels
Memory Maximum Ever Used	Maximum memory ever used.	none specified, brief , history
Memory Available	Memory currently available.	none specified, brief
Size (kB)	Memory capacity in 1000-byte kilobytes.	none specified, brief , history , summary
Percentage	Percentage of memory currently available.	none specified, brief
When	Timestamp.	none specified, brief , history

Table 18: show task memory Output Fields (*continued*)

Field Name	Field Description	Level of Output
Overall Memory Report	Memory utilization by memory size: <ul style="list-style-type: none"> • Size—Block size, in bytes. • TPT—indicates transient memory, and P indicates full page. • Allocs—Number of blocks allocated for named objects. • Mallocs—Number of blocks allocated for anonymous objects. • Alloc Bytes—Number of blocks allocated times block size. • MaxAllocs—Maximum value of Allocs. • MaxBytes—Maximum value of Alloc Bytes. • FreeBytes—Total number of bytes unused on memory pages for this block size. 	detail
Allocator Memory Report	Memory utilization by named objects: <ul style="list-style-type: none"> • Size—Size of the named object in bytes. • Alloc Size—Actual memory used by that object in bytes. • DTP—indicates debug, D T indicates transient, and P indicates full page. • Alloc Blocks—Number of named objects allocated. • AllocBytes—Number of blocks allocated times block size. • MaxAlloc Blocks—Maximum value of Alloc Blocks. • Max Alloc Bytes—Maximum value of AllocBytes. 	detail
Malloc Usage Report	Memory utilization for miscellaneous use: <ul style="list-style-type: none"> • Allocs—Number of allocations. • Bytes—Total bytes consumed. • MaxAllocs—Maximum value of Allocs. • MaxBytes—Maximum value of Bytes. • FuncCalls—Cumulative number of Allocs. 	detail
Dynamically allocated memory	Memory allocated dynamically by the system.	detail
Program data+BSS memory	Program and base station subsystem (BSS) memory.	detail
Page data overhead	Internal memory overhead.	detail
Page directory size	Internal memory overhead.	detail
Total bytes in use	Total memory, in bytes, that is currently in use and percentage of available memory (in parentheses).	detail

Sample Output

show task memory

```
user@host> show task memory
Memory              Size (kB)  Percentage  When
Currently In Use:    29417      3%         now
Maximum Ever Used:    33882      4%         00/02/11 22:07:03
Available:           756281    100%        now
```

show task memory detail

```
user@host> show task memory detail
----- Overall Memory Report -----
Size TP    Allocs  Mallocs  AllocBytes  MaxAllocs  MaxBytes  FreeBytes
8      -      111      888        112        896       3208
12     92      149      2892       247        2964      1204
12 T   -      -        -          5          60        -
16     7      11      288        23         368       3808
20     100    33      2660       164        3280      1436
20 T   -      -        -          40         800       -
24     162    15      4248       177        4248      3944
24 T   -      -        -          4          96        -
28     371    -        10388      372        10416     1900
32     6      23      928        30         960       3168
...
-----
606182 715302 118810

----- Allocator Memory Report -----
Name              Size Alloc DTP  Alloc  Alloc  MaxAlloc  MaxAlloc
                Size  Size  Blocks Bytes  Blocks  Bytes
patroot           8  12      84   1008    87    1044
sockaddr_un.i802  8  12       2    24     2     24
cos_nhm_nh        8  12       1    12     1     12
sockaddr_un.tag   8  12       3    36     4     48
gw_entry_list     8  12       1    12     1     12
bgp_riblist_01    8  12       1    12     2     24
ospf_intf_ev      8  12       -     -     6     72
krt_remnant_rt    8  12 T     -     -     5     60
...
-----
164108 221552

----- Malloc Usage Report -----
Name              Allocs  Bytes  MaxAllocs  MaxBytes  FuncCalls
MGMT.local        1       8       1         8         1
BGP.0.0.0.0+179   -       -       1         8         2
BGP RT Background 4    74748    4    74748     4
SNMP Subagent./var/run/ -    52     1    9172     56
OSPFv2 I/O./var/run/ppm 1   66536    2   66552   4551
OSPF              6   67655    7   67703    68
KRT              -       -     1    3784    18
ASPaths          3     80     3     80     3
-- sockaddr --   183    2100   184    2108   1645
BFD I/O./var/run/bfdd_c 1   65535    2   65551   4555
RT              48     872    48     872    48
Scheduler        42     628    43     628    88
--Anonymous--    56    1100    58    1140   112
--System--       82   58364   114   60044   4654
-----
337678 352398
```

Dynamically allocated memory:	765952	Maximum:	765952
Program data+BSS memory:	1568768	Maximum:	1568768
Page data overhead:	53248	Maximum:	53248
Page directory size:	4096	Maximum:	4096

Total bytes in use:	2392064	(0% of available memory)	

show task replication

Syntax	show task replication
Release Information	Command introduced in Junos OS Release 8.5. Command introduced in Junos OS Release 9.0 for EX Series switches.
Description	Displays nonstop active routing (NSR) status. When you issue this command on the master Routing Engine, the status of nonstop active routing synchronization is also displayed.
Options	This command has no options.
Required Privilege Level	view
List of Sample Output	show task replication (Issued on the Master Routing Engine) on page 428 show task replication (Issued on the Backup Routing Engine) on page 428
Output Fields	Table 19 on page 427 lists the output fields for the show task replication command. Output fields are listed in the approximate order in which they appear.

Table 19: show task replication Output Fields

Field Name	Field Description
Stateful replication	Displays whether or not graceful Routing Engine switchover is configured. The status can be Enabled or Disabled .
RE mode	Displays the Routing Engine on which the command is issued: Master , Backup , or Not applicable (when the router has only one Routing Engine).
Protocol	Protocols that are supported by nonstop active routing.
Synchronization Status	Nonstop active routing synchronization status for the supported protocols. States are NotStarted , InProgress , and Complete .

Sample Output

show task replication
(Issued on the Master
Routing Engine)

```
user@host> show task replication
          Stateful Replication: Enabled
          RE mode: Master

          Protocol      Synchronization Status
          OSPF           NotStarted
          BGP            Complete
          IS-IS          NotStarted
          LDP            Complete
          PIM            Complete
```

show task replication
(Issued on the Backup
Routing Engine)

```
user@host> show task replication
          Stateful Replication: Enabled
          RE mode: Backup
```

show version

Syntax	show version <brief detail>
Syntax (EX Series Switches)	show version <all-members> <brief detail> <local> <member <i>member-id</i> >
Syntax (TX Matrix Router)	show version <brief detail> <all-chassis all-lcc lcc <i>number</i> scc>
Syntax (TX Matrix Plus Router)	show version <all-chassis all-lcc lcc <i>number</i> sfc <i>number</i> > <brief detail>
Syntax (MX Series Router)	show version <brief detail> <all-members> <local> <member <i>member-id</i> >
Syntax (QFX Series)	show version <brief detail> <component <i>component-name</i> all>
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 the hostname and version information about the software running on the router or switch.
Options	<p>none—Display standard information about the hostname and version of the software running on the router or switch.</p> <p>brief detail—(Optional) Display the specified level of output.</p> <p>all-members—(EX4200 switches and MX Series routers only) (Optional) Display standard information about the hostname and version of the software running on all members of the Virtual Chassis configuration.</p> <p>component all—(QFabric systems only) (Optional) Display the host name and version information about the software running on all the components on the QFabric system.</p> <p>component <i>component-name</i>—(QFabric systems only) (Optional) Display the host name and version information about the software running on a specific QFabric system component. Replace <i>component-name</i> with the name of the QFabric system component.</p>

component. The *component-name* can be the name of a diagnostics Routing Engine, Director group, fabric control Routing Engine, fabric manager Routing Engine, Interconnect device, or Node group.

local—(EX4200 switches and MX Series routers only) (Optional) Display standard information about the hostname and version of the software running on the local Virtual Chassis member.

member *member-id*—(EX4200 switches and MX Series routers only) (Optional) Display standard information about the hostname and version of the software running 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.

scc—(TX Matrix routers only) (Optional) Display the hostname and version information about the software running on the TX Matrix router (or switch-card chassis).

lcc *number*—(TX Matrix routers and TX Matrix Plus routers only) (Optional) On a TX Matrix router, display the host name and version information about the software running on for a specified T640 router (line-card chassis or LCC) that is connected to the TX Matrix router. On a TX Matrix Plus router, display the host name and version information about the software running for a specified T1600 or T4000 router (LCC) that is connected to the TX Matrix Plus router.

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

- 0 through 3, when T640 routers are connected to a TX Matrix router in a routing matrix.
- 0 through 3, when T1600 routers are connected to a TX Matrix Plus router in a routing matrix.
- 0 through 7, when T1600 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.
- 0, 2, 4, or 6, when T4000 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.

sfc *number*—(TX Matrix Plus routers only) (Optional) Display the hostname and version information about the software running on the TX Matrix Plus router (or switch-fabric chassis). Replace *number* with 0.

Additional Information By default, when you issue the **show version** 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) or T1600 or T4000 (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) or T1600 or T4000 (in a 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 version on page 432](#)
[show version \(TX Matrix Plus Router\) on page 433](#)
[show version \(TX Matrix Plus Router with 3D SIBs\) on page 435](#)
[show version \(MX Series Router\) on page 439](#)
[show version \(QFX3500 Switch\) on page 439](#)
[show version \(QFabric System\) on page 439](#)
[show version component all \(QFabric System\) on page 439](#)

Sample Output

show version

```
user@host> show version
Hostname: router1
Model: m20
JUNOS Base OS boot [7.2-20050312.0]
JUNOS Base OS Software Suite [7.2-20050312.0]
JUNOS Kernel Software Suite [7.2R1.7]
JUNOS Packet Forwarding Engine Support (M20/M40) [7.2R1.7]
JUNOS Routing Software Suite [7.2R1.7]
JUNOS Online Documentation [7.2R1.7]
JUNOS Crypto Software Suite [7.2R1.7]

{master}

user@host> show version psd 1
psd1-re0:
-----
Hostname: china
Model: t640
JUNOS Base OS boot [9.1I20080311_1959_builder]
JUNOS Base OS Software Suite [9.1-20080321.0]
JUNOS Kernel Software Suite [9.1-20080321.0]
JUNOS Crypto Software Suite [9.1-20080321.0]
JUNOS Packet Forwarding Engine Support (M/T Common) [9.1-20080321.0]
JUNOS Packet Forwarding Engine Support (T-series) [9.1-20080321.0]
JUNOS Online Documentation [9.1-20080321.0]
JUNOS Routing Software Suite [9.1-20080321.0]
labpkg [7.0]
```

show version (TX Matrix Plus Router)

```
user@host> show version
sfc0-re0:
```

```
-----
Hostname: host
Model: tpx
JUNOS Base OS boot [12.3-20121019.0]
JUNOS Base OS Software Suite [12.3-20121019.0]
JUNOS Kernel Software Suite [12.3-20121019.0]
JUNOS Crypto Software Suite [12.3-20121019.0]
JUNOS Packet Forwarding Engine Support (M/T Common) [12.3-20121019.0]
JUNOS Packet Forwarding Engine Support (T-Series) [12.3-20121019.0]
JUNOS Online Documentation [12.3-20121019.0]
JUNOS Services ACL Container package [12.3-20121019.0]
JUNOS Services Application Level Gateways [12.3-20121019.0]
JUNOS AppId Services [12.3-20121019.0]
JUNOS Border Gateway Function package [12.3-20121019.0]
JUNOS Services Captive Portal and Content Delivery Container package
[12.3-20121019.0]
JUNOS Services HTTP Content Management package [12.3-20121019.0]
JUNOS IDP Services [12.3-20121019.0]
JUNOS Services LL-PDF Container package [12.3-20121019.0]
JUNOS Services NAT [12.3-20121019.0]
JUNOS Services PTSP Container package [12.3-20121019.0]
JUNOS Services RPM [12.3-20121019.0]
JUNOS Services Stateful Firewall [12.3-20121019.0]
JUNOS Voice Services Container package [12.3-20121019.0]
JUNOS Services Example Container package [12.3-20121019.0]
JUNOS Services Crypto [12.3-20121019.0]
JUNOS Services SSL [12.3-20121019.0]
JUNOS Services IPSec [12.3-20121019.0]
JUNOS Runtime Software Suite [12.3-20121019.0]
JUNOS Routing Software Suite [12.3-20121019.0]
```

```
lcc0-re0:
```

```
-----
Hostname: host1
Model: t1600
JUNOS Base OS boot [12.3-20121019.0]
JUNOS Base OS Software Suite [12.3-20121019.0]
JUNOS Kernel Software Suite [12.3-20121019.0]
JUNOS Crypto Software Suite [12.3-20121019.0]
JUNOS Packet Forwarding Engine Support (M/T Common) [12.3-20121019.0]
JUNOS Packet Forwarding Engine Support (T-Series) [12.3-20121019.0]
JUNOS Online Documentation [12.3-20121019.0]
JUNOS Services ACL Container package [12.3-20121019.0]
JUNOS Services Application Level Gateways [12.3-20121019.0]
JUNOS AppId Services [12.3-20121019.0]
JUNOS Border Gateway Function package [12.3-20121019.0]
JUNOS Services Captive Portal and Content Delivery Container package
[12.3-20121019.0]
JUNOS Services HTTP Content Management package [12.3-20121019.0]
JUNOS IDP Services [12.3-20121019.0]
JUNOS Services LL-PDF Container package [12.3-20121019.0]
JUNOS Services NAT [12.3-20121019.0]
JUNOS Services PTSP Container package [12.3-20121019.0]
JUNOS Services RPM [12.3-20121019.0]
JUNOS Services Stateful Firewall [12.3-20121019.0]
JUNOS Voice Services Container package [12.3-20121019.0]
JUNOS Services Example Container package [12.3-20121019.0]
JUNOS Services Crypto [12.3-20121019.0]
JUNOS Services SSL [12.3-20121019.0]
```

JUNOS Services IPSec [12.3-20121019.0]
JUNOS Runtime Software Suite [12.3-20121019.0]
JUNOS Routing Software Suite [12.3-20121019.0]

lcc1-re0:

Hostname: host2
Model: t1600
JUNOS Base OS boot [12.3-20121019.0]
JUNOS Base OS Software Suite [12.3-20121019.0]
JUNOS Kernel Software Suite [12.3-20121019.0]
JUNOS Crypto Software Suite [12.3-20121019.0]
JUNOS Packet Forwarding Engine Support (M/T Common) [12.3-20121019.0]
JUNOS Packet Forwarding Engine Support (T-Series) [12.3-20121019.0]
JUNOS Online Documentation [12.3-20121019.0]
JUNOS Services AACL Container package [12.3-20121019.0]
JUNOS Services Application Level Gateways [12.3-20121019.0]
JUNOS AppId Services [12.3-20121019.0]
JUNOS Border Gateway Function package [12.3-20121019.0]
JUNOS Services Captive Portal and Content Delivery Container package [12.3-20121019.0]
JUNOS Services HTTP Content Management package [12.3-20121019.0]
JUNOS IDP Services [12.3-20121019.0]
JUNOS Services LL-PDF Container package [12.3-20121019.0]
JUNOS Services NAT [12.3-20121019.0]
JUNOS Services PTSP Container package [12.3-20121019.0]
JUNOS Services RPM [12.3-20121019.0]
JUNOS Services Stateful Firewall [12.3-20121019.0]
JUNOS Voice Services Container package [12.3-20121019.0]
JUNOS Services Example Container package [12.3-20121019.0]
JUNOS Services Crypto [12.3-20121019.0]
JUNOS Services SSL [12.3-20121019.0]
JUNOS Services IPSec [12.3-20121019.0]
JUNOS Runtime Software Suite [12.3-20121019.0]
JUNOS Routing Software Suite [12.3-20121019.0]

lcc2-re0:

Hostname: host3
Model: t1600
JUNOS Base OS boot [12.3-20121019.0]
JUNOS Base OS Software Suite [12.3-20121019.0]
JUNOS Kernel Software Suite [12.3-20121019.0]
JUNOS Crypto Software Suite [12.3-20121019.0]
JUNOS Packet Forwarding Engine Support (M/T Common) [12.3-20121019.0]
JUNOS Packet Forwarding Engine Support (T-Series) [12.3-20121019.0]
JUNOS Online Documentation [12.3-20121019.0]
JUNOS Services AACL Container package [12.3-20121019.0]
JUNOS Services Application Level Gateways [12.3-20121019.0]
JUNOS AppId Services [12.3-20121019.0]
JUNOS Border Gateway Function package [12.3-20121019.0]
JUNOS Services Captive Portal and Content Delivery Container package [12.3-20121019.0]
JUNOS Services HTTP Content Management package [12.3-20121019.0]
JUNOS IDP Services [12.3-20121019.0]
JUNOS Services LL-PDF Container package [12.3-20121019.0]
JUNOS Services NAT [12.3-20121019.0]
JUNOS Services PTSP Container package [12.3-20121019.0]
JUNOS Services RPM [12.3-20121019.0]
JUNOS Services Stateful Firewall [12.3-20121019.0]
JUNOS Voice Services Container package [12.3-20121019.0]

```
JUNOS Services Example Container package [12.3-20121019.0]
JUNOS Services Crypto [12.3-20121019.0]
JUNOS Services SSL [12.3-20121019.0]
JUNOS Services IPSec [12.3-20121019.0]
JUNOS Runtime Software Suite [12.3-20121019.0]
JUNOS Routing Software Suite [12.3-20121019.0]
```

```
lcc3-re0:
```

```
-----
Hostname: host4
Model: t1600
JUNOS Base OS boot [12.3-20121019.0]
JUNOS Base OS Software Suite [12.3-20121019.0]
JUNOS Kernel Software Suite [12.3-20121019.0]
JUNOS Crypto Software Suite [12.3-20121019.0]
JUNOS Packet Forwarding Engine Support (M/T Common) [12.3-20121019.0]
JUNOS Packet Forwarding Engine Support (T-Series) [12.3-20121019.0]
JUNOS Online Documentation [12.3-20121019.0]
JUNOS Services ACL Container package [12.3-20121019.0]
JUNOS Services Application Level Gateways [12.3-20121019.0]
JUNOS AppId Services [12.3-20121019.0]
JUNOS Border Gateway Function package [12.3-20121019.0]
JUNOS Services Captive Portal and Content Delivery Container package
[12.3-20121019.0]
JUNOS Services HTTP Content Management package [12.3-20121019.0]
JUNOS IDP Services [12.3-20121019.0]
JUNOS Services LL-PDF Container package [12.3-20121019.0]
JUNOS Services NAT [12.3-20121019.0]
JUNOS Services PTSP Container package [12.3-20121019.0]
JUNOS Services RPM [12.3-20121019.0]
JUNOS Services Stateful Firewall [12.3-20121019.0]
JUNOS Voice Services Container package [12.3-20121019.0]
JUNOS Services Example Container package [12.3-20121019.0]
JUNOS Services Crypto [12.3-20121019.0]
JUNOS Services SSL [12.3-20121019.0]
JUNOS Services IPSec [12.3-20121019.0]
JUNOS Runtime Software Suite [12.3-20121019.0]
JUNOS Routing Software Suite [12.3-20121019.0]
```

**show version (TX
Matrix Plus Router with
3D SIBs)**

```
user@host>show version
sfc0-re0:
-----
Hostname: sfc0
Model: txp
JUNOS Base OS boot [13.1-20130306.0]
JUNOS Base OS Software Suite [13.1-20130306.0]
JUNOS Kernel Software Suite [13.1-20130306.0]
JUNOS Crypto Software Suite [13.1-20130306.0]
JUNOS Packet Forwarding Engine Support (M/T Common) [13.1-20130306.0]
JUNOS Packet Forwarding Engine Support (T-Series) [13.1-20130306.0]
JUNOS Online Documentation [13.1-20130306.0]
JUNOS Services ACL Container package [13.1-20130306.0]
JUNOS Services Application Level Gateways [13.1-20130306.0]
JUNOS AppId Services [13.1-20130306.0]
JUNOS Border Gateway Function package [13.1-20130306.0]
JUNOS Services Captive Portal and Content Delivery Container package
[13.1-20130306.0]
JUNOS Services HTTP Content Management package [13.1-20130306.0]
JUNOS IDP Services [13.1-20130306.0]
JUNOS Services Jflow Container package [13.1-20130306.0]
JUNOS Services LL-PDF Container package [13.1-20130306.0]
```

```
JUNOS Services MobileNext Software package [13.1-20130306.0]
JUNOS Services Mobile Subscriber Service Container package [13.1-20130306.0]
JUNOS Services NAT [13.1-20130306.0]
JUNOS Services PTSP Container package [13.1-20130306.0]
JUNOS Services RPM [13.1-20130306.0]
JUNOS Services Stateful Firewall [13.1-20130306.0]
JUNOS Voice Services Container package [13.1-20130306.0]
JUNOS Services Example Container package [13.1-20130306.0]
JUNOS Services Crypto [13.1-20130306.0]
JUNOS Services SSL [13.1-20130306.0]
JUNOS Services IPSec [13.1-20130306.0]
JUNOS Runtime Software Suite [13.1-20130306.0]
JUNOS Routing Software Suite [13.1-20130306.0]
```

```
lcc0-re0:
```

```
-----
Hostname: lcc0
Model: t4000
JUNOS Base OS boot [13.1-20130306.0]
JUNOS Base OS Software Suite [13.1-20130306.0]
JUNOS Kernel Software Suite [13.1-20130306.0]
JUNOS Crypto Software Suite [13.1-20130306.0]
JUNOS Packet Forwarding Engine Support (M/T Common) [13.1-20130306.0]
JUNOS Packet Forwarding Engine Support (T-Series) [13.1-20130306.0]
JUNOS Online Documentation [13.1-20130306.0]
JUNOS Services AACL Container package [13.1-20130306.0]
JUNOS Services Application Level Gateways [13.1-20130306.0]
JUNOS AppId Services [13.1-20130306.0]
JUNOS Border Gateway Function package [13.1-20130306.0]
JUNOS Services Captive Portal and Content Delivery Container package
[13.1-20130306.0]
JUNOS Services HTTP Content Management package [13.1-20130306.0]
JUNOS IDP Services [13.1-20130306.0]
JUNOS Services Jflow Container package [13.1-20130306.0]
JUNOS Services LL-PDF Container package [13.1-20130306.0]
JUNOS Services MobileNext Software package [13.1-20130306.0]
JUNOS Services Mobile Subscriber Service Container package [13.1-20130306.0]
JUNOS Services NAT [13.1-20130306.0]
JUNOS Services PTSP Container package [13.1-20130306.0]
JUNOS Services RPM [13.1-20130306.0]
JUNOS Services Stateful Firewall [13.1-20130306.0]
JUNOS Voice Services Container package [13.1-20130306.0]
JUNOS Services Example Container package [13.1-20130306.0]
JUNOS Services Crypto [13.1-20130306.0]
JUNOS Services SSL [13.1-20130306.0]
JUNOS Services IPSec [13.1-20130306.0]
JUNOS Runtime Software Suite [13.1-20130306.0]
JUNOS Routing Software Suite [13.1-20130306.0]
```

```
lcc2-re0:
```

```
-----
Hostname: lcc2
Model: t4000
JUNOS Base OS boot [13.1-20130306.0]
JUNOS Base OS Software Suite [13.1-20130306.0]
JUNOS Kernel Software Suite [13.1-20130306.0]
JUNOS Crypto Software Suite [13.1-20130306.0]
JUNOS Packet Forwarding Engine Support (M/T Common) [13.1-20130306.0]
JUNOS Packet Forwarding Engine Support (T-Series) [13.1-20130306.0]
JUNOS Online Documentation [13.1-20130306.0]
JUNOS Services AACL Container package [13.1-20130306.0]
```

```

JUNOS Services Application Level Gateways [13.1-20130306.0]
JUNOS AppId Services [13.1-20130306.0]
JUNOS Border Gateway Function package [13.1-20130306.0]
JUNOS Services Captive Portal and Content Delivery Container package
[13.1-20130306.0]
JUNOS Services HTTP Content Management package [13.1-20130306.0]
JUNOS IDP Services [13.1-20130306.0]
JUNOS Services Jflow Container package [13.1-20130306.0]
JUNOS Services LL-PDF Container package [13.1-20130306.0]
JUNOS Services MobileNext Software package [13.1-20130306.0]
JUNOS Services Mobile Subscriber Service Container package [13.1-20130306.0]
JUNOS Services NAT [13.1-20130306.0]
JUNOS Services PTSP Container package [13.1-20130306.0]
JUNOS Services RPM [13.1-20130306.0]
JUNOS Services Stateful Firewall [13.1-20130306.0]
JUNOS Voice Services Container package [13.1-20130306.0]
JUNOS Services Example Container package [13.1-20130306.0]
JUNOS Services Crypto [13.1-20130306.0]
JUNOS Services SSL [13.1-20130306.0]
JUNOS Services IPSec [13.1-20130306.0]
JUNOS Runtime Software Suite [13.1-20130306.0]
JUNOS Routing Software Suite [13.1-20130306.0]

```

```
lcc4-re0:
```

```

-----
Hostname: lcc4
Model: t4000
JUNOS Base OS boot [13.1-20130306.0]
JUNOS Base OS Software Suite [13.1-20130306.0]
JUNOS Kernel Software Suite [13.1-20130306.0]
JUNOS Crypto Software Suite [13.1-20130306.0]
JUNOS Packet Forwarding Engine Support (M/T Common) [13.1-20130306.0]
JUNOS Packet Forwarding Engine Support (T-Series) [13.1-20130306.0]
JUNOS Online Documentation [13.1-20130306.0]
JUNOS Services ACL Container package [13.1-20130306.0]
JUNOS Services Application Level Gateways [13.1-20130306.0]
JUNOS AppId Services [13.1-20130306.0]
JUNOS Border Gateway Function package [13.1-20130306.0]
JUNOS Services Captive Portal and Content Delivery Container package
[13.1-20130306.0]
JUNOS Services HTTP Content Management package [13.1-20130306.0]
JUNOS IDP Services [13.1-20130306.0]
JUNOS Services Jflow Container package [13.1-20130306.0]
JUNOS Services LL-PDF Container package [13.1-20130306.0]
JUNOS Services MobileNext Software package [13.1-20130306.0]
JUNOS Services Mobile Subscriber Service Container package [13.1-20130306.0]
JUNOS Services NAT [13.1-20130306.0]
JUNOS Services PTSP Container package [13.1-20130306.0]
JUNOS Services RPM [13.1-20130306.0]
JUNOS Services Stateful Firewall [13.1-20130306.0]
JUNOS Voice Services Container package [13.1-20130306.0]
JUNOS Services Example Container package [13.1-20130306.0]
JUNOS Services Crypto [13.1-20130306.0]
JUNOS Services SSL [13.1-20130306.0]
JUNOS Services IPSec [13.1-20130306.0]
JUNOS Runtime Software Suite [13.1-20130306.0]
JUNOS Routing Software Suite [13.1-20130306.0]

```

```
lcc6-re0:
```

```
Hostname: tcc6
Model: t1600
JUNOS Base OS boot [13.1-20130306.0]
JUNOS Base OS Software Suite [13.1-20130306.0]
JUNOS Kernel Software Suite [13.1-20130306.0]
JUNOS Crypto Software Suite [13.1-20130306.0]
JUNOS Packet Forwarding Engine Support (M/T Common) [13.1-20130306.0]
JUNOS Packet Forwarding Engine Support (T-Series) [13.1-20130306.0]
JUNOS Online Documentation [13.1-20130306.0]
JUNOS Services AACL Container package [13.1-20130306.0]
JUNOS Services Application Level Gateways [13.1-20130306.0]
JUNOS AppId Services [13.1-20130306.0]
JUNOS Border Gateway Function package [13.1-20130306.0]
JUNOS Services Captive Portal and Content Delivery Container package
[13.1-20130306.0]
JUNOS Services HTTP Content Management package [13.1-20130306.0]
JUNOS IDP Services [13.1-20130306.0]
JUNOS Services Jflow Container package [13.1-20130306.0]
JUNOS Services LL-PDF Container package [13.1-20130306.0]
JUNOS Services MobileNext Software package [13.1-20130306.0]
JUNOS Services Mobile Subscriber Service Container package [13.1-20130306.0]
JUNOS Services NAT [13.1-20130306.0]
JUNOS Services PTSP Container package [13.1-20130306.0]
JUNOS Services RPM [13.1-20130306.0]
JUNOS Services Stateful Firewall [13.1-20130306.0]
JUNOS Voice Services Container package [13.1-20130306.0]
JUNOS Services Example Container package [13.1-20130306.0]
JUNOS Services Crypto [13.1-20130306.0]
JUNOS Services SSL [13.1-20130306.0]
JUNOS Services IPSec [13.1-20130306.0]
JUNOS Runtime Software Suite [13.1-20130306.0]
JUNOS Routing Software Suite [13.1-20130306.0]
```

tcc7-re0:

```
-----
Hostname: tcc7
Model: t1600
JUNOS Base OS boot [13.1-20130306.0]
JUNOS Base OS Software Suite [13.1-20130306.0]
JUNOS Kernel Software Suite [13.1-20130306.0]
JUNOS Crypto Software Suite [13.1-20130306.0]
JUNOS Packet Forwarding Engine Support (M/T Common) [13.1-20130306.0]
JUNOS Packet Forwarding Engine Support (T-Series) [13.1-20130306.0]
JUNOS Online Documentation [13.1-20130306.0]
JUNOS Services AACL Container package [13.1-20130306.0]
JUNOS Services Application Level Gateways [13.1-20130306.0]
JUNOS AppId Services [13.1-20130306.0]
JUNOS Border Gateway Function package [13.1-20130306.0]
JUNOS Services Captive Portal and Content Delivery Container package
[13.1-20130306.0]
JUNOS Services HTTP Content Management package [13.1-20130306.0]
JUNOS IDP Services [13.1-20130306.0]
JUNOS Services Jflow Container package [13.1-20130306.0]
JUNOS Services LL-PDF Container package [13.1-20130306.0]
JUNOS Services MobileNext Software package [13.1-20130306.0]
JUNOS Services Mobile Subscriber Service Container package [13.1-20130306.0]
JUNOS Services NAT [13.1-20130306.0]
JUNOS Services PTSP Container package [13.1-20130306.0]
JUNOS Services RPM [13.1-20130306.0]
JUNOS Services Stateful Firewall [13.1-20130306.0]
```



```
JUNOS Voice Services Container package [13.1-20130306.0]
JUNOS Services Example Container package [13.1-20130306.0]
JUNOS Services Crypto [13.1-20130306.0]
JUNOS Services SSL [13.1-20130306.0]
JUNOS Services IPSec [13.1-20130306.0]
JUNOS Runtime Software Suite [13.1-20130306.0]
JUNOS Routing Software Suite [13.1-20130306.0]
```

show version (MX Series Router)

```
user@host5> show version
Hostname: host5
Model: mx80
JUNOS Base OS boot [11.3-20110717.0]
JUNOS Base OS Software Suite [11.3-20110717.0]
JUNOS Kernel Software Suite [11.3-20110717.0]
JUNOS Crypto Software Suite [11.3-20110717.0]
JUNOS Packet Forwarding Engine Support (MX80) [11.3-20110717.0]
JUNOS Online Documentation [11.3-20110717.0]
JUNOS Routing Software Suite [11.3-20110717.0]
```

show version (QFX3500 Switch)

```
user@switch> show version
Hostname: switch
Model: qfx_s3500
JUNOS Base OS boot [11.1R1]
JUNOS Base OS Software Suite [11.1R1]
JUNOS Kernel Software Suite [11.1R1]
JUNOS Crypto Software Suite [11.1R1]
JUNOS Online Documentation [11.1R1]
JUNOS Enterprise Software Suite [11.1R1]
JUNOS Packet Forwarding Engine Support (QFX) [11.1R1]
JUNOS Routing Software Suite [11.1R1]
```

show version (QFabric System)

```
user@qfabric> show version
Hostname: qfabric
Model: qfx3000-g
Serial Number: qfsn-0123456789
QFabric System ID: f158527a-f99e-11e0-9fbd-00e081c57cda
JUNOS Base Version [12.2I20111018_0215_dc-builder]
```

show version component all (QFabric System)

```
user@switch> show version component all
dg1:
-
Hostname: qfabric
Model: qfx3100
JUNOS Base Version [11.3R1.6]

dg0:
-
Hostname: qfabric
Model: qfx3100
JUNOS Base Version [11.3R1.6]

NW-NG-0:
-
Hostname: qfabric
Model: qfx-jvre
JUNOS Base OS boot [11.3R1.6]
JUNOS Base OS Software Suite [11.3R1.6]
```

```
JUNOS Kernel Software Suite [11.3R1.6]
JUNOS Crypto Software Suite [11.3R1.6]
JUNOS Online Documentation [11.3R1.6]
JUNOS Enterprise Software Suite [11.3R1.6]
JUNOS Packet Forwarding Engine Support (QFX RE) [11.3R1.6]
JUNOS Routing Software Suite [11.3R1.6]
```

```
FC-0:
```

```
-
Hostname: qfabric
Model: qfx-jvre
JUNOS Base OS boot [11.3R1.6]
JUNOS Base OS Software Suite [11.3R1.6]
JUNOS Kernel Software Suite [11.3R1.6]
JUNOS Crypto Software Suite [11.3R1.6]
JUNOS Online Documentation [11.3R1.6]
JUNOS Enterprise Software Suite [11.3R1.6]
JUNOS Packet Forwarding Engine Support (QFX RE) [11.3R1.6]
JUNOS Routing Software Suite [11.3R1.6]
```

```
FC-1:
```

```
Hostname: qfabric
Model: qfx-jvre
JUNOS Base OS boot [11.3R1.6]
JUNOS Base OS Software Suite [11.3R1.6]
JUNOS Kernel Software Suite [11.3R1.6]
JUNOS Crypto Software Suite [11.3R1.6]
JUNOS Online Documentation [11.3R1.6]
JUNOS Enterprise Software Suite [11.3R1.6]
JUNOS Packet Forwarding Engine Support (QFX RE) [11.3R1.6]
JUNOS Routing Software Suite [11.3R1.6]
```

```
DRE-0:
```

```
-
Hostname: dre-0
Model: qfx-jvre
JUNOS Base OS boot [11.3R1.6]
JUNOS Base OS Software Suite [11.3R1.6]
JUNOS Kernel Software Suite [11.3R1.6]
JUNOS Crypto Software Suite [11.3R1.6]
JUNOS Online Documentation [11.3R1.6]
JUNOS Enterprise Software Suite [11.3R1.6]
JUNOS Packet Forwarding Engine Support (QFX RE) [11.3R1.6]
JUNOS Routing Software Suite [11.3R1.6]
```

```
FM-0:
```

```
-
Hostname: qfabric
Model: qfx-jvre
JUNOS Base OS boot [11.3R1.6]
JUNOS Base OS Software Suite [11.3R1.6]
JUNOS Kernel Software Suite [11.3R1.6]
JUNOS Crypto Software Suite [11.3R1.6]
JUNOS Online Documentation [11.3R1.6]
JUNOS Enterprise Software Suite [11.3R1.6]
JUNOS Packet Forwarding Engine Support (QFX RE) [11.3R1.6]
JUNOS Routing Software Suite [11.3R1.6]
```


```
nodedevice1:
```

```
-
Hostname: qfabric
```

```
Model: QFX3500
JUNOS Base OS boot [11.3R1.6]
JUNOS Base OS Software Suite [11.3R1.6]
JUNOS Kernel Software Suite [11.3R1.6]
JUNOS Crypto Software Suite [11.3R1.6]
JUNOS Online Documentation [11.3R1.6]
JUNOS Enterprise Software Suite [11.3R1.6]
JUNOS Packet Forwarding Engine Support (QFX RE) [11.3R1.6]
JUNOS Routing Software Suite [11.3R1.6]

interconnectdevice1:
-
Hostname: qfabric
Model: QFX3108
JUNOS Base OS boot [11.3R1.6]
JUNOS Base OS Software Suite [11.3R1.6]
JUNOS Kernel Software Suite [11.3R1.6]
JUNOS Crypto Software Suite [11.3R1.6]
JUNOS Online Documentation [11.3R1.6]
JUNOS Enterprise Software Suite [11.3R1.6]
JUNOS Packet Forwarding Engine Support (QFX RE) [11.3R1.6]
JUNOS Routing Software Suite [11.3R1.6]
warning: from interconnectdevice0: Disconnected
```

start shell

Syntax	start shell (csh sh) <user <i>username</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	Exit from the CLI environment and create a UNIX-level shell. To return to the CLI, type exit from the shell.
	<div> NOTE:<ul style="list-style-type: none">• To issue this command, the user must have the required login access privileges configured by including the permissions statement at the [edit system login class <i>class-name</i>] hierarchy level.• UNIX wheel group membership or permissions are no longer required to issue this command.</div>
Options	csh —Create a UNIX C shell. sh —Create a UNIX Bourne shell. user <i>username</i> —(Optional) Start the shell as another user.
Additional Information	When you are in the shell, the shell prompt has the following format: <i>username@hostname%</i> An example of the prompt is: root@host%
Required Privilege Level	shell and maintenance
List of Sample Output	start shell csh on page 443
Output Fields	When you enter this command, you are provided feedback on the status of your request.

Sample Output

start shell csh

```
user@host> start shell csh
%

exit
%

username@hostname% start shell sh
%

exit
user@host>
```

test configuration

Syntax	<code>test configuration filename</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	Verify that the syntax of a configuration file is correct. If the configuration contains any syntax or commit check errors, a message is displayed to indicate the line number and column number in which the error was found.
Options	filename —Name of the configuration file. syntax-only —Check the syntax of a partial configuration file, without checking for commit errors. This option introduced in Junos OS Release 12.1.
Required Privilege Level	view
List of Sample Output	test configuration on page 444
Output Fields	When you enter this command, you are provided feedback on the status of your request.

Sample Output

```
test configuration      user@host> test configuration terminal
                        [Type ^D to end input]
                        system {
                        host-name bluesky;
                        paris-23;
                        login;
                        }
                        terminal:3:(8) syntax error: paris
                        [edit system]
                        'paris-23;'
                        syntax error
                        terminal:4:(11) statement must contain additional statements: ;
                        [edit system login]
                        'login ;'
                        statement must contain additional statements
                        configuration syntax failed
```

PART 4

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