



Junos[®] OS

System Basics: Getting Started Configuration Guide

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Junos® OS System Basics: Getting Started Configuration Guide

12.1

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Table of Contents

| | | |
|------------------|--|----------|
| | About the Documentation | xiii |
| | Documentation and Release Notes | xiii |
| | Supported Platforms | xiii |
| | Using the Examples in This Manual | xiii |
| | Merging a Full Example | xiv |
| | Merging a Snippet | xiv |
| | Documentation Conventions | xv |
| | Documentation Feedback | xvii |
| | Requesting Technical Support | xvii |
| | Self-Help Online Tools and Resources | xvii |
| | Opening a Case with JTAC | xviii |
| Part 1 | Overview | |
| Chapter 1 | Junos OS Overview | 3 |
| | Junos OS Overview | 3 |
| | Junos OS Architecture Overview | 5 |
| | Product Architecture | 5 |
| | Routing Process Architecture | 5 |
| | Packet Forwarding Engine | 6 |
| | Routing Engine | 6 |
| | Router Hardware Components | 7 |
| | Junos OS Commit Model for Router or Switch Configuration | 8 |
| | Junos OS Routing Engine Components and Processes | 9 |
| | Routing Engine Kernel | 10 |
| | Initialization Process | 10 |
| | Management Process | 10 |
| | Process Limits | 10 |
| | Routing Protocol Process | 10 |
| | Interface Process | 10 |
| | Chassis Process | 11 |
| | SNMP and MIB II Processes | 11 |
| | Junos OS Support for IPv4 Routing Protocols | 11 |
| | Junos OS Support for IPv6 Routing Protocols | 13 |
| | Junos OS Routing and Forwarding Tables | 13 |
| | Routing Policy Overview | 14 |
| | Junos OS Support for VPNs | 15 |
| | Junos OS Configuration Basics | 16 |
| | Junos OS Configuration from External Devices | 16 |
| | Junos OS Tracing and Logging Operations | 16 |

| | | |
|------------------|---|-----------|
| Chapter 2 | Junos OS Security Overview | 19 |
| | Junos OS Default Settings for Router Security | 19 |
| | Junos OS Features for Router Security | 19 |
| | Methods of Remote Access for Router Management | 20 |
| | Junos OS Supported Protocols and Methods for User Authentication | 21 |
| | Junos OS Plain-Text Password Requirements | 21 |
| | Junos OS Support for Routing Protocol Security Features and IPsec | 22 |
| | Junos OS Support for Firewall Filters | 22 |
| | Junos OS Auditing Support for Security | 23 |
| Chapter 3 | Junos OS Configuration Overview | 25 |
| | Methods for Configuring Junos OS | 26 |
| | Junos OS Command-Line Interface (CLI) | 27 |
| | ASCII File | 27 |
| | J-Web Package | 27 |
| | Junos XML Management Protocol Software | 28 |
| | NETCONF XML Management Protocol Software | 28 |
| | Configuration Commit Scripts | 28 |
| | Junos OS Configuration Using the CLI | 29 |
| | Creating and Activating a Candidate Configuration | 29 |
| | Format for Specifying IP Addresses, Network Masks, and Prefixes in Junos OS Configuration Statements | 30 |
| | Format for Specifying Filenames and URLs in Junos OS CLI Commands | 30 |
| | Default Directories for Junos OS File Storage on the Router or Switch | 32 |
| | Directories on the Logical System | 32 |
| | Initial Router or Switch Configuration Using the Junos OS | 33 |
| Chapter 4 | Junos OS Monitoring Tools Overview | 35 |
| | Junos OS Tools for Monitoring the Router | 35 |
| Part 2 | Configuration | |
| Chapter 5 | Configuring Basic System Management Features | 39 |
| | Configuring Basic Router or Switch Properties | 40 |
| | Configuring the Hostname of the Router or Switch | 41 |
| | Mapping the Name of the Router to IP Addresses | 41 |
| | Configuring an ISO System Identifier for the Router | 42 |
| | Example: Configuring the Name of the Router, IP Address, and System ID | 42 |
| | Configuring the Domain Name for the Router or Switch | 43 |
| | Example: Configuring the Domain Name for the Router or Switch | 43 |
| | Configuring the Domains to Search When a Router or Switch Is Included in Multiple Domains | 44 |
| | Configuring a DNS Name Server for Resolving a Hostname into Addresses | 44 |
| | Example: Configuring a Proxy Server for License Updates | 45 |
| | Configuring a Backup Router | 48 |
| | Configuring a Backup Router Running IPv4 | 49 |
| | Configuring a Backup Router Running IPv6 | 49 |
| | Configuring Automatic Mirroring of the CompactFlash Card on the Hard Disk Drive | 50 |

| | |
|--|-----------|
| Using Junos OS to Specify the Number of Configurations Stored on the CompactFlash Card | 50 |
| Using Junos OS to Configure a Router or Switch to Transfer Its Configuration to an Archive Site | 51 |
| Configuring the Router or Switch to Transfer Its Currently Active Configuration to an Archive | 51 |
| Configuring the Transfer Interval for Periodic Transfer of the Active Configuration to an Archive Site | 52 |
| Configuring Transfer of the Current Active Configuration When a Configuration Is Committed | 52 |
| Configuring Archive Sites for Transfer of Active Configuration Files | 52 |
| Configuring the Physical Location of the Router or Switch | 53 |
| Configuring the Root Password | 54 |
| Example: Configuring the Root Password | 56 |
| Example: Configuring a Plain-Text Password for Root Logins | 56 |
| Example: Configuring SSH Authentication for Root Logins | 56 |
| Special Requirements for Junos OS Plain-Text Passwords | 57 |
| Changing the Requirements for Junos OS Plain-Text Passwords | 59 |
| Example: Changing the Requirements for Junos OS Plain-Text Passwords | 59 |
| Configuring the Junos OS to Set Console and Auxiliary Port Properties | 60 |
| Configuring Multiple Routing Engines to Synchronize Committed Configurations Automatically | 61 |
| Compressing the Current Configuration File | 61 |
| Configuring the Junos OS to Make the Router or Interface Act as a DHCP or BOOTP Relay Agent | 62 |
| Disabling Junos OS Processes | 63 |
| Viewing Core Files from Junos OS Processes | 63 |
| Saving Core Files from Junos OS Processes | 63 |
| Configuring Failover to Backup Media if a Junos OS Process Fails | 64 |
| Configuring the Junos OS to Display a System Login Message | 64 |
| Configuring the Junos OS to Display a System Login Announcement | 66 |
| Configuring the Junos OS for the First Time on a Router or Switch with a Single Routing Engine | 66 |
| Configuring the Junos OS the First Time on a Router with Dual Routing Engines | 71 |
| Configuring CLI Tips | 76 |
| Upgrading to 64-bit Junos OS | 77 |
| Disk Space Management for Junos OS Installation | 80 |
| Chapter 6 Configuration Statements | 83 |
| System Management Configuration Statements | 83 |
| announcement | 89 |
| archival | 90 |
| archive-sites (Configuration File) | 91 |
| autoinstallation | 92 |
| backup-router | 93 |
| commit synchronize | 94 |
| compress-configuration-files | 95 |
| configuration | 96 |

| | | |
|------------------|--|------------|
| | configuration-servers | 97 |
| | domain-name | 97 |
| | domain-search | 98 |
| | dump-device | 99 |
| | events | 100 |
| | host-name | 100 |
| | inet6-backup-router | 101 |
| | interfaces | 102 |
| | load-key-file | 103 |
| | location | 104 |
| | login-tip | 105 |
| | max-configurations-on-flash | 105 |
| | message | 106 |
| | mirror-flash-on-disk | 107 |
| | name-server | 108 |
| | password | 108 |
| | pic-console-authentication | 109 |
| | port | 110 |
| | port (Proxy Server) | 110 |
| | ports | 111 |
| | processes | 112 |
| | proxy | 113 |
| | root-authentication | 114 |
| | root-login | 115 |
| | saved-core-context | 116 |
| | saved-core-files | 116 |
| | server (Proxy) | 117 |
| | static-host-mapping | 117 |
| | system | 118 |
| | transfer-interval (Configuration) | 119 |
| | transfer-on-commit | 120 |
| | trusted-key | 121 |
| Part 3 | Administration | |
| Chapter 7 | File Management Commands | 125 |
| | file archive | 126 |
| | file checksum md5 | 128 |
| | file checksum sha1 | 129 |
| | file checksum sha-256 | 130 |
| | file compare | 131 |
| | file copy | 134 |
| | file delete | 136 |
| | file list | 137 |
| | file rename | 139 |
| | file show | 141 |
| Chapter 8 | System Software Administrative Commands | 143 |
| | clear system commit | 144 |
| | clear system reboot | 145 |

| | | |
|------------------|--|------------|
| | configure | 148 |
| | request system configuration rescue delete | 150 |
| | request system configuration rescue save | 151 |
| | request system halt | 152 |
| | request system license add | 157 |
| | request system license delete | 158 |
| | request system license save | 159 |
| | request system logout | 160 |
| | request system partition abort | 161 |
| | request system partition hard-disk | 163 |
| | request system power-off | 165 |
| | request system reboot | 169 |
| | request system snapshot | 173 |
| | request system software add | 179 |
| Chapter 9 | System Software Monitoring Commands | 187 |
| | show configuration | 188 |
| | show host | 191 |
| | show system commit | 192 |
| | show system configuration archival | 194 |
| | show system configuration rescue | 195 |
| | show system processes | 197 |
| | show system queues | 222 |
| | show system reboot | 228 |
| | show system rollback | 231 |
| | show system snapshot | 233 |
| | show system software | 236 |
| | show system statistics | 244 |
| | show system storage | 278 |
| | show system switchover | 284 |
| | show system uptime | 288 |
| | show system virtual-memory | 292 |
| | show task | 349 |
| | show task io | 351 |
| | show task memory | 353 |
| | show task replication | 357 |
| | show version | 359 |
| | start shell | 369 |
| | test configuration | 371 |
| Part 4 | Index | 375 |

List of Figures

| | | |
|------------------|--|-----------|
| Part 1 | Overview | |
| Chapter 1 | Junos OS Overview | 3 |
| | Figure 1: Product Architecture | 6 |
| Part 2 | Configuration | |
| Chapter 5 | Configuring Basic System Management Features | 39 |
| | Figure 2: Proxy Server Example | 45 |
| | Figure 3: Upgrading to the 64-bit Junos OS with Dual Routing Engines | 78 |
| | Figure 4: Upgrading to the 64-bit Junos OS with a Single Routing Engine (Master in Either Slot) | 79 |
| | Figure 5: Upgrading to the 64-bit Junos OS with a Single Routing Engine (Master Must Be in Slot 0) | 80 |

List of Tables

| | | |
|------------------|--|-------------|
| | About the Documentation | xiii |
| | Table 1: Notice Icons | xv |
| | Table 2: Text and Syntax Conventions | xv |
| Part 1 | Overview | |
| Chapter 1 | Junos OS Overview | 3 |
| | Table 3: Major Router Hardware Components | 7 |
| Chapter 3 | Junos OS Configuration Overview | 25 |
| | Table 4: Methods for Configuring Junos OS | 26 |
| Part 2 | Configuration | |
| Chapter 5 | Configuring Basic System Management Features | 39 |
| | Table 5: Special Requirements for Plain-Text Passwords | 57 |
| Part 3 | Administration | |
| Chapter 9 | System Software Monitoring Commands | 187 |
| | Table 6: show system commit Output Fields | 192 |
| | Table 7: show system processes Output Fields | 202 |
| | Table 8: show system queues Output Fields | 223 |
| | Table 9: show system snapshot Output Fields | 234 |
| | Table 10: show system storage Output Fields | 280 |
| | Table 11: show system switchover Output Fields | 286 |
| | Table 12: show system uptime Output Fields | 290 |
| | Table 13: show system virtual-memory Output Fields | 295 |
| | Table 14: show task Output Fields | 349 |
| | Table 15: show task io Output Fields | 351 |
| | Table 16: show task memory Output Fields | 353 |
| | Table 17: show task replication Output Fields | 357 |

About the Documentation

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

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:

- M Series
- MX Series
- T Series
- J 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 [Junos OS 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 xv 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 |

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

| Convention | Description | Examples |
|--------------------------------|--|---|
| <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 [community-ids] |
| 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. | |
| J-Web GUI Conventions | | |
| Bold text like this | Represents J-Web 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 J-Web 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 19](#)
- [Junos OS Configuration Overview on page 25](#)
- [Junos OS Monitoring Tools Overview on page 35](#)

CHAPTER 1

Junos OS Overview

- [Junos OS Overview on page 3](#)
- [Junos OS Architecture Overview on page 5](#)
- [Router Hardware Components on page 7](#)
- [Junos OS Commit Model for Router or Switch Configuration on page 8](#)
- [Junos OS Routing Engine Components and Processes on page 9](#)
- [Junos OS Support for IPv4 Routing Protocols on page 11](#)
- [Junos OS Support for IPv6 Routing Protocols on page 13](#)
- [Junos OS Routing and Forwarding Tables on page 13](#)
- [Routing Policy Overview on page 14](#)
- [Junos OS Support for VPNs on page 15](#)
- [Junos OS Configuration Basics on page 16](#)
- [Junos OS Configuration from External Devices on page 16](#)
- [Junos OS Tracing and Logging Operations on page 16](#)

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. 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, Junos OS 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 all product lines simultaneously.

Because features are common to a single source, generally these features are implemented the same way for all the product lines, thus 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 must include all working features released in previous releases of the software and must achieve zero critical regression errors. This discipline ensures reliable operations for the entire release.

One Modular Software Architecture

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 others and cause a full system crash or restart. This modular architecture then provides for a high level of performance, high availability, security, and device scalability not found in other operating systems.

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

You can upgrade the router software as new features are added or software problems are fixed. You normally obtain new software by downloading the images from the Juniper Networks Support Web page onto your router or onto another system on your local network. Then you 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 Architecture Overview on page 5](#)
- [Router Hardware Components on page 7](#)
- [Junos OS Commit Model for Router or Switch Configuration on page 8](#)
- [Junos OS Routing Engine Components and Processes on page 9](#)
- [Junos OS Support for IPv4 Routing Protocols on page 11](#)
- [Junos OS Support for IPv6 Routing Protocols on page 13](#)
- [Junos OS Routing and Forwarding Tables on page 13](#)
- [Routing Policy Overview on page 14](#)
- [Junos OS Support for VPNs on page 15](#)

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 5](#)

Product Architecture

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

- J Series Services Routers (J2300, J4300, and J6300) are deployed at the remote edge of distributed networks.
- Most M Series routers are 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.
- The 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, 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.

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 a 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.

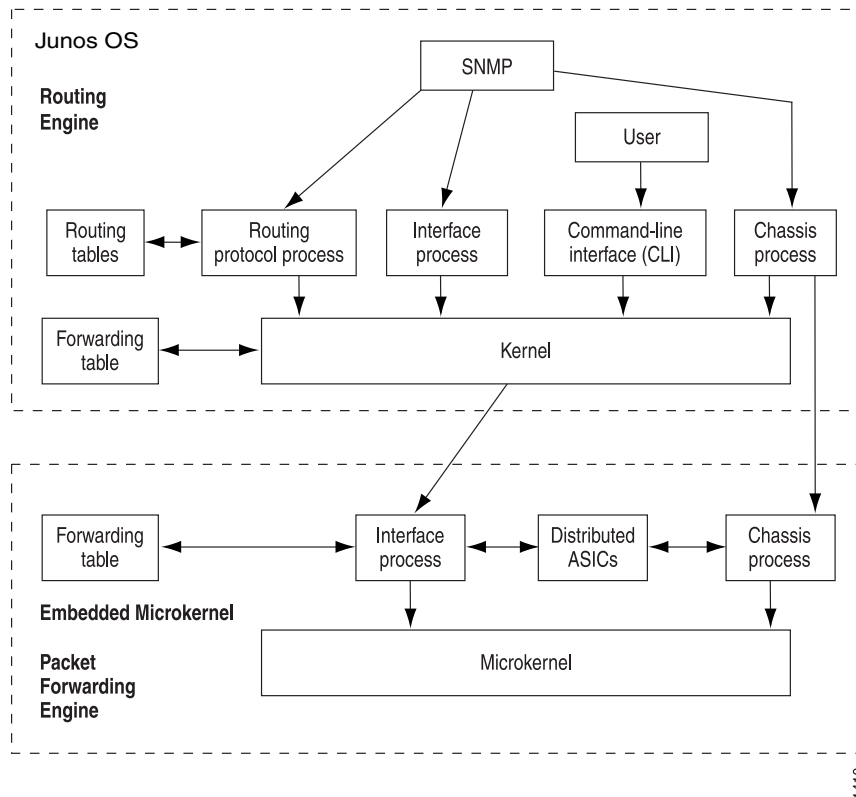
Routing Process Architecture

The routing process is handled by the following two components (see [Figure 1 on page 6](#)):

- 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 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 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 delay the Packet Forwarding Engine unnecessarily.
- Software modularity—Software functions have been divided into 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—The Junos routing tables are designed to hold all the routes used in current and near-future networks. Additionally, the Junos OS can efficiently support large numbers of interfaces and virtual circuits.
- Management interfaces—System management is possible 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 can be held and maintained in one primary and two secondary storage systems, permitting local or remote upgrades.
- Monitoring efficiency and flexibility—Alarms can be generated and packets can be 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](#)

Router Hardware Components

The Junos OS runs on the following types of Juniper Networks routers and Packet Transport Switches: J Series, M Series, MX Series, T Series, and PTX Series Packet Transport Switches. Each network device consists of the major hardware components as shown in [Table 3 on page 7](#). One or more of the major hardware components shown is used in each system.

Table 3: Major Router Hardware Components

| | M Series | MX Series | T Series | PTX Series | J Series |
|-----------------|----------|-----------|----------|------------|----------|
| Routing Engines | X | X | X | X | X |

Table 3: Major Router Hardware Components (*continued*)

| | M Series | MX Series | T Series | PTX Series | J Series |
|----------------------------------|----------|-----------|----------|------------|----------|
| 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 | |
| Physical Interface Module (PIM) | | | | | X |
| Physical Interface Card (PIC) | 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: that is, a candidate configuration is modified as desired and then committed to the system. Once a configuration has been 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 former active configuration file is saved as the first rollback configuration file (**juniper.conf.1.gz**), and all 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 (1–49) 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 **synchronize** command.

Related Documentation

- [Configuring the Junos OS for the First Time on a Router or Switch with a Single Routing Engine on page 66](#)

Junos OS Routing Engine Components and Processes

The Junos OS runs on the Routing Engine. The Junos OS consists of software processes that support Internet routing protocols, control router interfaces and the router chassis, and enable router system management. The 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. The 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. In addition, it provides the link between the routing tables and the Routing Engine's forwarding table. It 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

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

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, it 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 (which slot the Flexible PIC Concentrator [FPC] is installed in and which location on the FPC the Physical Interface Card [PIC] is installed in), 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 the Junos OS to track the status and condition of the router's interfaces.

Chassis Process

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

SNMP and MIB II Processes

The 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 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 consist of an SNMP master agent and various subagents.

Related Documentation • [Junos OS Architecture Overview on page 5](#)

Junos OS Support for IPv4 Routing Protocols

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 13](#)

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 11](#)

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 14](#)

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 13](#)
- [Junos OS Support for IPv4 Routing Protocols on page 11](#)
- [Junos OS Support for IPv6 Routing Protocols on page 13](#)

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 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 16](#)
 - [Methods for Configuring Junos OS on page 26](#)
 - [Initial Router or Switch Configuration Using the Junos OS on page 33](#)

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 26](#)
 - [Configuring the Junos OS to Set Console and Auxiliary Port Properties on page 60](#)

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 Configuration Guide](#).

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 Configuration Guide](#).
- 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 19](#)
- [Junos OS Features for Router Security on page 19](#)

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.

Related Documentation

- [Example: Consolidated Security Configuration](#)

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 20](#)
- [Junos OS Supported Protocols and Methods for User Authentication on page 21](#)
- [Junos OS Plain-Text Password Requirements on page 21](#)
- [Junos OS Support for Routing Protocol Security Features and IPsec on page 22](#)
- [Junos OS Support for Firewall Filters on page 22](#)
- [Junos OS Auditing Support for Security on page 23](#)

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 routers connected to a TX Matrix Plus router in a routing matrix, and T640 routers with a Routing Engine supporting 64-bit Junos OS, the management interface is **fxp0**. On a TX Matrix Plus router, T1600 router, T1600 routers in a routing matrix, and T640 routers with a Routing Engine supporting 64-bit Junos OS, 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

- [Example: Configuring Firewall Filters](#)
- [IPsec Overview](#)
- [Junos OS System Log Configuration Overview](#)

CHAPTER 3

Junos OS Configuration Overview

- [Methods for Configuring Junos OS on page 26](#)
- [Junos OS Configuration Using the CLI on page 29](#)
- [Creating and Activating a Candidate Configuration on page 29](#)
- [Format for Specifying IP Addresses, Network Masks, and Prefixes in Junos OS Configuration Statements on page 30](#)
- [Format for Specifying Filenames and URLs in Junos OS CLI Commands on page 30](#)
- [Default Directories for Junos OS File Storage on the Router or Switch on page 32](#)
- [Initial Router or Switch Configuration Using the Junos OS on page 33](#)

Methods for Configuring Junos OS

You can use any of the methods shown in [Table 4 on page 26](#) to configure Junos OS:

Table 4: 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 27](#)
- [ASCII File on page 27](#)
- [J-Web Package on page 27](#)
- [Junos XML Management Protocol Software on page 28](#)

- [NETCONF XML Management Protocol Software on page 28](#)
- [Configuration Commit Scripts on page 28](#)

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 [Junos OS CLI User Guide](#) and [Junos OS System Basics and Services Command Reference](#).

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 [Junos OS 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 System Basics and Services Command Reference](#).

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 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 Configuration and Operations Automation Guide](#).

Related Documentation

- [Junos OS Configuration from External Devices on page 16](#)

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 [Junos OS 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 80](#)
- [Creating and Activating a Candidate Configuration on page 29](#)

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 8](#)

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 30](#)

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:
```
- **http://hostname/path/filename**—File on an HTTP server. You can also specify **hostname** as **username@hostname** or **username:password@hostname**. If a password is required and you omit it, you are prompted for it.
- **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
```

Related Documentation

- [Format for Specifying IP Addresses, Network Masks, and Prefixes in Junos OS Configuration Statements on page 30](#)
- [Default Directories for Junos OS File Storage on the Router or Switch on page 32](#)

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 located either on the hard disk (device **wd2**) or internal flash storage. It contains the following subdirectories:
 - **/var/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.
 - **/var/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**.
 - **/var/log**—Contains system log and tracing files.
 - **/var/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

Logical systems have their individual directory structure created in the **/var/logical-systems/logical-system-name** directory. It 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.

The new 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 now save and load configuration files at the logical-system 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 level.

Related Documentation

- [Format for Specifying Filenames and URLs in Junos OS CLI Commands on page 30](#)

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 Ethernet management interface—On all routers other than the TX Matrix Plus router and T1600 routers in a routing matrix, T640 router with

64bit Routing Engine, the management Ethernet Interface is **fxp0**. On a TX Matrix Plus router, T1600 routers with the **RE-DUO-C1800-8G** Routing Engine configured in a routing matrix, and T640 routers with a Routing Engine supporting 64-bit Junos OS, the management Ethernet interface is **em0**.



NOTE: The management Ethernet interface created on a T1600 standalone router (not part of a routing matrix and not connected to a TX Matrix Plus router) continues to be **fxp0** and not **em0**. The **em0** management Ethernet interface is only applicable for a TX Matrix Plus router, T1600 routers connected to a TX Matrix Plus router in a routing matrix, and T640 routers with a Routing Engine supporting 64-bit Junos OS.

- 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 the Junos OS for the First Time on a Router or Switch with a Single Routing Engine on page 66](#)
- [Configuring the Junos OS the First Time on a Router with Dual Routing Engines on page 71](#)
- [Junos OS Configuration Using the CLI on page 29](#)

CHAPTER 4

Junos OS Monitoring Tools Overview

- [Junos OS Tools for Monitoring the Router on page 35](#)

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 26](#)
- [Junos OS Features for Router Security on page 19](#)

PART 2

Configuration

- [Configuring Basic System Management Features on page 39](#)
- [Configuration Statements on page 83](#)

CHAPTER 5

Configuring Basic System Management Features

- [Configuring Basic Router or Switch Properties on page 40](#)
- [Configuring the Hostname of the Router or Switch on page 41](#)
- [Mapping the Name of the Router to IP Addresses on page 41](#)
- [Configuring an ISO System Identifier for the Router on page 42](#)
- [Example: Configuring the Name of the Router, IP Address, and System ID on page 42](#)
- [Configuring the Domain Name for the Router or Switch on page 43](#)
- [Example: Configuring the Domain Name for the Router or Switch on page 43](#)
- [Configuring the Domains to Search When a Router or Switch Is Included in Multiple Domains on page 44](#)
- [Configuring a DNS Name Server for Resolving a Hostname into Addresses on page 44](#)
- [Example: Configuring a Proxy Server for License Updates on page 45](#)
- [Configuring a Backup Router on page 48](#)
- [Configuring Automatic Mirroring of the CompactFlash Card on the Hard Disk Drive on page 50](#)
- [Using Junos OS to Specify the Number of Configurations Stored on the CompactFlash Card on page 50](#)
- [Using Junos OS to Configure a Router or Switch to Transfer Its Configuration to an Archive Site on page 51](#)
- [Configuring the Physical Location of the Router or Switch on page 53](#)
- [Configuring the Root Password on page 54](#)
- [Example: Configuring the Root Password on page 56](#)
- [Example: Configuring a Plain-Text Password for Root Logins on page 56](#)
- [Example: Configuring SSH Authentication for Root Logins on page 56](#)
- [Special Requirements for Junos OS Plain-Text Passwords on page 57](#)
- [Changing the Requirements for Junos OS Plain-Text Passwords on page 59](#)
- [Example: Changing the Requirements for Junos OS Plain-Text Passwords on page 59](#)
- [Configuring the Junos OS to Set Console and Auxiliary Port Properties on page 60](#)

- [Configuring Multiple Routing Engines to Synchronize Committed Configurations Automatically on page 61](#)
- [Compressing the Current Configuration File on page 61](#)
- [Configuring the Junos OS to Make the Router or Interface Act as a DHCP or BOOTP Relay Agent on page 62](#)
- [Disabling Junos OS Processes on page 63](#)
- [Viewing Core Files from Junos OS Processes on page 63](#)
- [Saving Core Files from Junos OS Processes on page 63](#)
- [Configuring Failover to Backup Media if a Junos OS Process Fails on page 64](#)
- [Configuring the Junos OS to Display a System Login Message on page 64](#)
- [Configuring the Junos OS to Display a System Login Announcement on page 66](#)
- [Configuring the Junos OS for the First Time on a Router or Switch with a Single Routing Engine on page 66](#)
- [Configuring the Junos OS the First Time on a Router with Dual Routing Engines on page 71](#)
- [Configuring CLI Tips on page 76](#)
- [Upgrading to 64-bit Junos OS on page 77](#)
- [Disk Space Management for Junos OS Installation on page 80](#)

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 41](#)
2. Map the router's hostname to IP addresses.
[See "Mapping the Name of the Router to IP Addresses" on page 41.](#)
3. Configure an ISO system identifier for the router.
[See "Configuring an ISO System Identifier for the Router" on page 42.](#)
4. Configure the router's domain name.
[See "Configuring the Domain Name for the Router or Switch" on page 43.](#)

Related Documentation

- [Example: Configuring the Name of the Router, IP Address, and System ID on page 42](#)
- [Configuring the Junos OS for the First Time on a Router or Switch with a Single Routing Engine on page 66](#)
- [Configuring the Junos OS the First Time on a Router with Dual Routing Engines on page 71](#)

- [Configuring the Physical Location of the Router or Switch on page 53](#)
- [Configuring a Backup Router on page 48](#)

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 42](#)
- [Example: Configuring the Name of the Switch, IP Address, and System ID](#)
- [Configuring Basic Router or Switch Properties on page 40](#)
- [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 40](#)
- [Example: Configuring the Name of the Router, IP Address, and System ID on page 42](#)
- [Example: Configuring a Router Name and Domain Name](#)

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 40](#)
- [Example: Configuring the Name of the Router, IP Address, and System ID on page 42](#)

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 40](#)

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 97](#)
 - domain-name
 - [Example: Configuring the Domain Name for the Router or Switch on page 43](#)

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 43](#)

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 43](#)
- [Configuring a DNS Name Server for Resolving a Hostname into Addresses on page 44](#)
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 one or more 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 44](#)

- [name-server on page 108](#)

Example: Configuring a Proxy Server for License Updates

- [Requirements on page 45](#)
- [Overview on page 45](#)
- [Configuration on page 45](#)
- [Verification on page 47](#)

Requirements

This example uses the following hardware and software components:

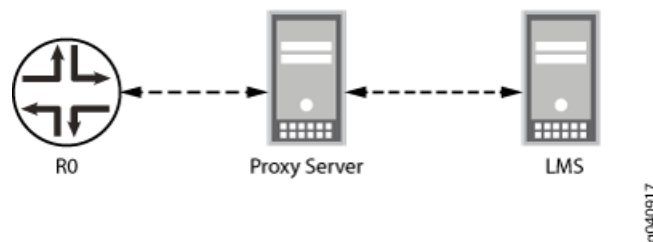
- An M Series or SRX Series device
- Junos OS Release 11.4 running on the device

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 45](#), **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 [Junos OS 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/t0B1hyeMIEmL7V4okqm"; ## 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 kbps

505 kB

**Related
Documentation**

- [password on page 108](#)
- [port on page 110](#)
- [proxy on page 113](#)
- [server on page 117](#)
- [username](#)

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 allow the router or switch to boot and to ensure that the router or switch is reachable over the network if the routing protocol process fails to start properly, you 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).

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, include the **destination** option. Specify the address in the format *network/mask-length* so that the entire network is reachable through the backup router.

By default, all hosts (default route) are reachable through the backup router. To eliminate the risk of 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.



NOTE: The routes 0.0.0.0/0 or ::/0 should not be used as a destination address in the backup router configuration. You must include a proper subnet range of /8 or higher in the destination address.

When the routing protocols start, the address of the backup router is removed from the local routing and forwarding tables. To have the address remain in these tables, configure a static route for that address by including the **static** statement at the **[edit routing-options]** hierarchy level.

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

1. [Configuring a Backup Router Running IPv4 on page 49](#)
2. [Configuring a Backup Router Running IPv6 on page 49](#)

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>;
```

The following example shows how to configure a backup router running IPv4 and have its address remain in the routing and forwarding tables:



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.

```
[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 the Junos OS for the First Time on a Router or Switch with a Single Routing Engine on page 66](#)
 - [Configuring the Junos OS the First Time on a Router with Dual Routing Engines on page 71](#)

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 50](#)
 - [Configuring the Junos OS for the First Time on a Router or Switch with a Single Routing Engine on page 66](#)

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 50](#)
- `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 51](#)
2. [Configuring the Transfer Interval for Periodic Transfer of the Active Configuration to an Archive Site on page 52](#)
3. [Configuring Transfer of the Current Active Configuration When a Configuration Is Committed on page 52](#)
4. [Configuring Archive Sites for Transfer of Active Configuration Files on page 52](#)

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 format for the destination filename is as follows:

```
<router-name>_juniper.conf[.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 40](#)

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-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: retry 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** or **ssh-rsa** statements to directly configure SSH RSA keys and SSH DSA keys to authenticate root logins. You can configure more than one public RSA or DSA 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 on page 56](#)
- [Example: Configuring a Plain-Text Password for Root Logins on page 56](#)
- [Example: Configuring SSH Authentication for Root Logins on page 56](#)
- [Example: Changing the Requirements for Junos OS Plain-Text Passwords on page 59](#)
- [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$14c5.$sBopasddsd0"
[edit]
user@switch# show
system {
  root-authentication {
    encrypted-password "$1$14c5.$sBopasddsd0";
  }
}
```

Related Documentation

- [Configuring the Root Password on page 54](#)
- [Example: Configuring a Plain-Text Password for Root Logins on page 56](#)
- [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: retry root password
[edit]
user@switch# show
system {
  root-authentication {
    encrypted-password "$1$14c5.$sBopasddsd0";
  }
}
```

Related Documentation

- [Configuring the Root Password on page 54](#)

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 54](#)
 - [Special Requirements for Junos OS Plain-Text Passwords on page 57](#)

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 5 on page 57](#) shows the default requirements.

Table 5: 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**, **a–s**, **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 59](#)
- [Configuring the Root Password on page 54](#)
- [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 | des);
    maximum-length length;
    minimum-changes number;
    minimum-length length;
}

```



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

Related Documentation

- [Special Requirements for Junos OS Plain-Text Passwords on page 57](#)
- [Configuring the Root Password on page 54](#)
- [Example: Changing the Requirements for Junos OS Plain-Text Passwords on page 59](#)

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

The following example shows how to set the minimum password length to 12 characters and the maximum length to 22 characters:

```

[edit system login]
passwords {
    minimum-length 12;
    maximum-length 22;
}

```

Related Documentation

- [Changing the Requirements for Junos OS Plain-Text Passwords on page 59](#)
- [Changing the Requirements for Junos OS Plain-Text Passwords](#)

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 26](#)
 - console
 - [ports on page 111](#)

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.

During the commit synchronization process, the master Routing Engine commits the configuration and sends a copy of the configuration to the backup Routing Engine. 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.

- Related Documentation**
- [Junos OS Commit Model for Router or Switch Configuration on page 8](#)

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 8](#)
- [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.

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 64](#)
- [Configuring Password Authentication for the Diagnostics Port](#)
- [Viewing Core Files from Junos OS Processes on page 63](#)

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 63](#)
- [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 63](#)

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 63](#)
- [Saving Core Files from Junos OS Processes on page 63](#)
- [processes on page 112](#)

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\naccess
to this equipment if you need authorization.\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
access to this equipment if you need authorization.
```

```
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 66](#).

Related Documentation

- [Configuring the Junos OS to Display a System Login Announcement on page 66](#)
- [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 64](#).



TIP: You can use the same special characters described in [“Configuring the Junos OS to Display a System Login Message” on page 64](#) to format your system login announcement.

Related Documentation

- [Configuring the Junos OS to Display a System Login Message on page 64](#)

Configuring the 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, the 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.



NOTE: For T640 routers with a Routing Engine supporting 32-bit Junos OS, the management interface is fxp0. For T640 routers with a Routing Engine supporting 64-bit Junos OS, it is em0.

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
```

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 all routers *except* the TX Matrix Plus router and T1600 routers in a routing matrix:

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

- For a TX Matrix Plus router and T1600 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
```

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 or when the Junos routing software (the routing protocol process, **rp**d) 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-rsa "public-key";
    ssh-dsa "public-key";
  }
  name-server {
    address;
  }
}
```

```

interfaces {
  fxp0 {
    unit 0 {
      family inet {
        address address ;
      }
    }
  }
}

```

On a TX Matrix Plus router, the management Ethernet interface is **em0** and not **fxp0**. Therefore, when you issue the **show** command in the configuration mode, the configuration statements would be:

```

[edit]
root@ show
system {
  host-name hostname;
  domain-name domain.name;
  backup-router address;
  root-authentication {
    (encrypted-password "password" | public-key);
    ssh-rsa "public-key";
    ssh-dsa "public-key";
  }
  name-server {
    address;
  }
  interfaces {
    em0 {
      unit 0 {
        family inet {
          address address ;
        }
      }
    }
  }
}

```

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#**.

Junos OS defaults 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 33](#)
- [Format for Specifying IP Addresses, Network Masks, and Prefixes in Junos OS Configuration Statements on page 30](#)
- [Default Directories for Junos OS File Storage on the Router or Switch on page 32](#)
- [Configuring Basic Router or Switch Properties on page 40](#)
- [Configuring Automatic Mirroring of the CompactFlash Card on the Hard Disk Drive on page 50](#)

Configuring the Junos OS the First Time on a Router 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.



NOTE: For T640 routers with a Routing Engine supporting 32-bit Junos OS, the management interface is **fxp0**. For T640 routers with a Routing Engine supporting 64-bit Junos OS, it is **em0**.

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

1. Go to “[Configuring the Junos OS for the First Time on a Router or Switch with a Single Routing Engine](#)” on page 66 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# set groups re0
```

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

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

4. 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>
```

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

- For all routers except the TX Matrix Plus router and T1600 routers in a routing matrix:

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

- For TX Matrix Plus and T1600 routers in a routing matrix only:

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

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

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

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

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

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

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

10. Specify the router hostname.

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

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

- For all routers except the TX Matrix Plus router and T1600 routers in a routing matrix:

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

- For TX Matrix Plus and T1600 routers in a routing matrix only:

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

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

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

15. Configure Routing Engine redundancy:

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

16. Save the configuration change on both Routing Engines:

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

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

1. Configure the IP address of the DNS server.

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

2. Configure the router domain name:

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

3. 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
```

4. 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: retry 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
```

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-rsa "public-key";
    ssh-dsa "public-key";
  }
  name-server {
    address;
  }
}
```

```

}
interfaces {
  fxp0 {
    unit 0 {
      family inet {
        address address ;
      }
    }
  }
}
}

```

On a TX Matrix Plus router, the management Ethernet interface is **em0** and not **fxp0**. Therefore, when you issue the **show** command in the configuration mode, the configuration statements would be:

```

[edit]
root@ show
system {
  host-name hostname;
  domain-name domain.name;
  backup-router address;
  root-authentication {
    (encrypted-password "password" | public-key);
    ssh-rsa "public-key";
    ssh-dsa "public-key";
  }
  name-server {
    address;
  }
  interfaces {
    em0 {
      unit 0 {
        family inet {
          address address ;
        }
      }
    }
  }
}

```

- 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 more information about creating configuration groups, see [Junos OS 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](#).

**Related
Documentation**

- [Configuring the Junos OS for the First Time on a Router or Switch with a Single Routing Engine on page 66](#)
- [Initial Router or Switch Configuration Using the Junos OS on page 33](#)
- [Format for Specifying IP Addresses, Network Masks, and Prefixes in Junos OS Configuration Statements on page 30](#)
- [Default Directories for Junos OS File Storage on the Router or Switch on page 32](#)
- [Configuring Basic Router or Switch Properties on page 40](#)
- [Configuring Automatic Mirroring of the CompactFlash Card on the Hard Disk Drive on page 50](#)

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

Upgrading to 64-bit Junos OS

Just like any other operating system, the 64-bit version of the 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 the Junos OS to the 64-bit version of the 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-JCS1200-1x2330

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

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

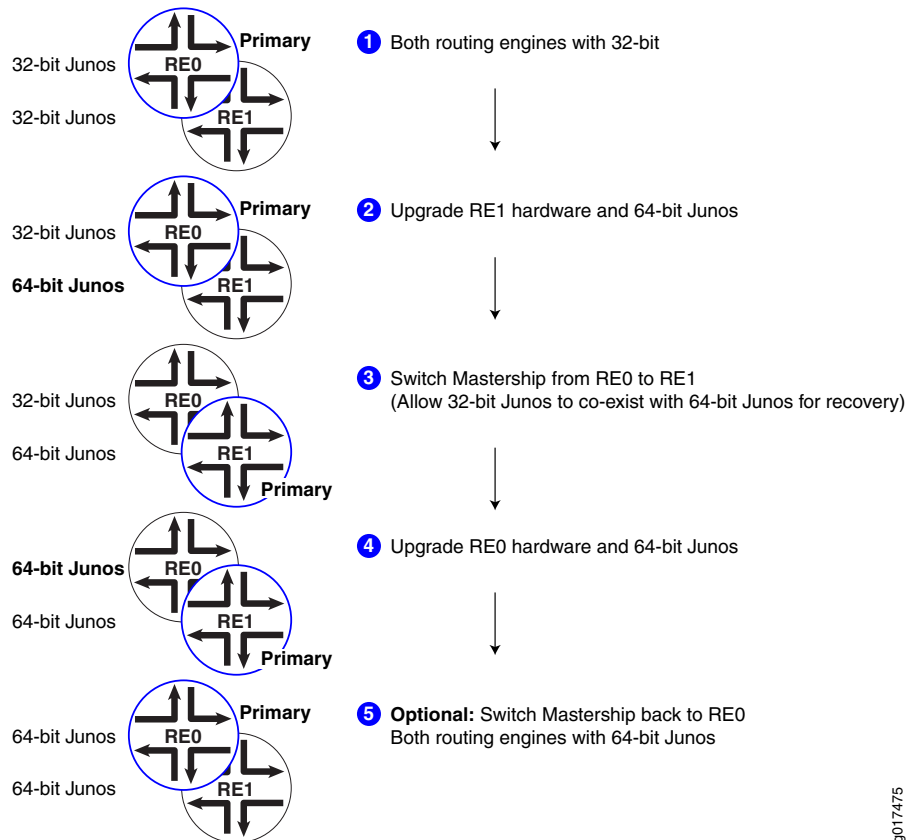
Before you begin, you must have:

- 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 78](#) and perform the following steps:

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



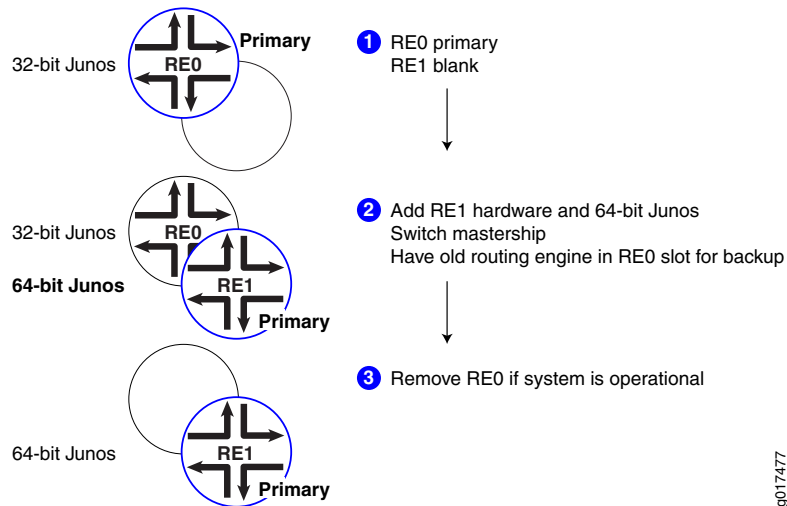
1. In the initial state, both Routing Engines are running the 32-bit Junos OS, and slot 0 has the master Routing Engine.
2. Upgrade the slot 1 Routing Engine hardware and install the 64-bit Junos OS.
For instructions on replacing a Routing Engine, see the hardware guide for your router.
3. Switch the 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.

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 78](#) and perform the following steps:

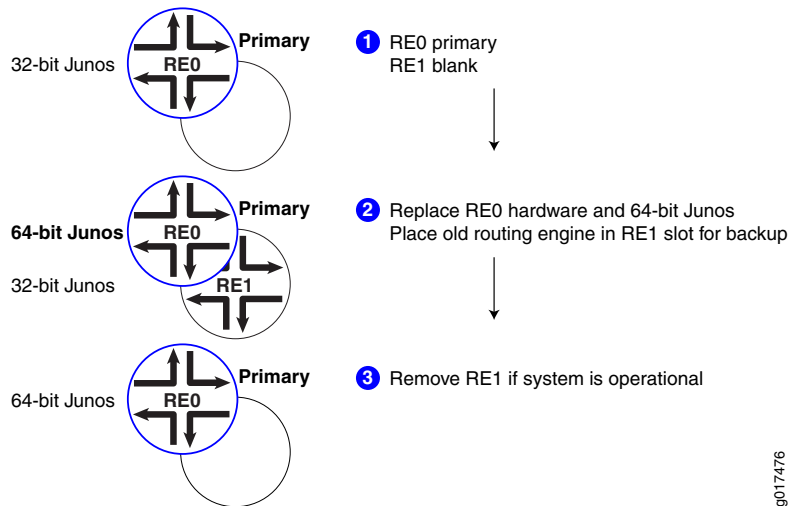
Figure 4: Upgrading to the 64-bit Junos OS with a Single Routing Engine (Master in Either Slot)



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 80](#) 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 29](#)

Configuration Statements

- [System Management Configuration Statements on page 83](#)

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 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-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 | <code>announcement <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 | 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 66 • message on page 106 |

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. |
| Options | The remaining statements are explained separately. |
| | <div>  <p>NOTE: The [edit system archival] hierarchy is not available on QFabric switches.</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 51 |

archive-sites (Configuration File)

| | |
|----------------------------|--|
| Syntax | <pre>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; }</pre> |
| Hierarchy Level | [edit system archival configuration] |
| 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 | <p>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,</p> <p>"scp://username<:password>@[ipv6-host-address]<:port>/url-path"</p> <p>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 format for the destination filename is</p> <p>router-name_juniper.conf[.gz]_YYYYMMDD_HHMMSS.</p> <div style="margin-top: 20px;">  <p>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.</p> </div> <div style="margin-top: 20px;">  <p>NOTE: The [edit system archival] hierarchy is not available on QFabric switches.</p> </div> |
| Options | <p>The prefix used in the configuration statement determines the form of transfer:</p> <p>file:// —transfer on a path to a named file</p> <p>ftp:// —transfer using active FTP server</p> <p>pasvftp:// —transfer to a device that only accepts passive FTP services</p> <p>scp:// —transfer to a known host using background SCP file transfers</p> |

Required Privilege Level system—To view this statement in the configuration.
system-control—To add this statement to the configuration.

Related Documentation

- [Configuring Archive Sites for Transfer of Active Configuration Files on page 52](#)
- [configuration on page 96](#)
- [transfer-on-commit on page 120](#)

autoinstallation

Syntax

```
autoinstallation {  
  configuration-servers {  
    url;  
  }  
  interfaces {  
    interface-name {  
      bootp;  
      rarp;  
    }  
  }  
}
```

Hierarchy Level [edit [system](#)]

Release Information Statement introduced before Junos OS Release 7.4.
Statement introduced in Junos OS Release 9.1 for EX Series switches.

Description For 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.

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

- [Upgrading Software Using Automatic Software Download on EX Series Switches](#)
- [J Series Services Router Basic LAN and WAN Access Configuration Guide](#)
- [configuration-servers on page 97](#)
- [idle-timeout](#)


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 <i>destination-address</i></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 48 |

commit synchronize

| | |
|---------------------------------|---|
| Syntax | commit synchronize; |
| Hierarchy Level | [edit system] |
| Release Information | Statement introduced in Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches. |
| Description | <p>For devices with multiple Routing Engines only. Configure a commit command to automatically result in a commit synchronize command. 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 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.</p> <p>Starting with Junos OS Release 9.3, accounting of events and operations on a backup Routing Engine is not supported on accounting servers such as TACACS+ or RADIUS. Logging of accounting events is supported only for events and operations on a master Routing Engine.</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 Multiple Routing Engines to Synchronize Committed Configurations Automatically on page 61 |

compress-configuration-files

| | |
|---------------------------------|--|
| Syntax | (compress-configuration-files no-compress-configuration-files); |
| Hierarchy Level | [edit system] |
| Release Information | Statement introduced before Junos OS Release 7.4. |
| Description | 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. |
| | <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 61 |

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 switches.

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 51](#)
- archive
- [archive-sites on page 91](#)
- [transfer-interval on page 119](#)
- [transfer-on-commit on page 120](#)

configuration-servers

| | |
|---------------------------------|--|
| Syntax | configuration-servers { <i>url</i> ; } |
| 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"> • Upgrading Software Using Automatic Software Download on EX Series Switches • Getting Started Guide for your router model • autoinstallation on page 92 • idle-timeout |

domain-name

| | |
|---------------------------------|--|
| Syntax | domain-name <i>domain-name</i> ; |
| 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 43 |

domain-search

| | |
|---------------------------------|---|
| Syntax | <code>domain-search [<i>domain-list</i>];</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 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 | 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 Domains to Search When a Router or Switch Is Included in Multiple Domains on page 44• Configuring the Router or Interface to Act as a DHCP Server on J Series Services Routers• Configuring a DHCP Server on EX Series Switches (CLI Procedure) |

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">• Configuring TACACS+ System Accounting |

host-name

| | |
|---------------------------------|---|
| Syntax | <code>host-name <i>hostname</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 the hostname of the router or switch. |
| Options | <i>hostname</i> —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 | <ul style="list-style-type: none">• Configuring the Hostname of the Router or Switch on page 41 |

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 | <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 48 |

interfaces

| | |
|---------------------------------|--|
| Syntax | <pre>interfaces { <i>interface-name</i> { 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 | bootp —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">• Upgrading Software Using Automatic Software Download on EX Series Switches• J Series Services Router Basic LAN and WAN Access Configuration Guide• autoinstallation on page 92 |

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 (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 54• Configuring the Root Password• Configuring Junos OS User Accounts• Configuring Junos OS User Accounts |

location

| | |
|--------------------------|--|
| 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 53](#)

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 76 |



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 50 |

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 64• announcement on page 89 |

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 50 |

name-server

| | |
|---------------------------------|---|
| Syntax | <code>name-server { <i>address</i>; }</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 | <i>address</i> —Address of the name server. To configure multiple name servers, include multiple <i>address</i> 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 44• Configuring the Router or Interface to Act as a DHCP Server on J Series Services Routers• Configuring a DHCP Server on EX Series Switches (CLI Procedure) |

password

| | |
|---------------------------------|--|
| Syntax | <code>password <i>password</i>;</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 45 |

pic-console-authentication

| | |
|---------------------------------|--|
| Syntax | <pre>pic-console authentication { (encrypted-password "<i>password</i>" 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 "<i>password</i>"—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 60 • Configuring Password Authentication for Console Access to PICs |

port

| | |
|---------------------------------|---|
| 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">• syslog• host |


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 45 |

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 60 |

processes

| | |
|--------------------------|---|
| Syntax | <pre>processes { <i>process-name</i> (enable disable) failover (alternate-media other-routing-engine); timeout <i>seconds</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 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><i>process-name</i>—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 <i>seconds</i>—(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 | 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">• Disabling Junos OS Processes on page 63 |

proxy

| | |
|---------------------------------|---|
| 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 45 |

root-authentication

| | |
|---------------------------------|---|
| Syntax | <pre>root-authentication { (encrypted-password "password" plain-text-password); ssh-dsa "public-key"; ssh-rsa "public-key"; }</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 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 | 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 54• authentication |

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">Configuring SSH Service for Remote Access to the Router or Switch |

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 | 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">• Saving Core Files from Junos OS Processes on page 63• saved-core-files on page 116 |

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 | 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">• Saving Core Files from Junos OS Processes on page 63• saved-core-context on page 116 |

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 45 |

static-host-mapping

| | |
|---------------------------------|---|
| Syntax | <pre>static-host-mapping { hostname { alias [aliases]; inet [addresses]; sysid system-identifier; } }</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 | 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 Hostname of the Router or Switch on page 41 |

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 | <ul style="list-style-type: none">• System Management Configuration Statements on page 83 |

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 switches.

| | |
|----------------|---|
| 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 switches.

| | |
|---------------------------------|---|
| 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 52 • archive • configuration on page 96 • transfer-on-commit on page 120 |
|------------------------------|--|

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 switches.

| | |
|---------------------------------|--|
| 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 52• archive• configuration on page 96• transfer-interval on page 119 |

trusted-key

| | |
|---------------------------------|--|
| Syntax | <code>trusted-key [<i>key-numbers</i>];</code> |
| Hierarchy Level | [edit system ntp] |
| 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">• Configuring NTP Authentication Keys• authentication-key• broadcast• peer• server |

PART 3

Administration

- [File Management Commands on page 125](#)
- [System Software Administrative Commands on page 143](#)
- [System Software Monitoring Commands on page 187](#)

CHAPTER 7

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 126 file archive (Single File) on page 126 file archive (with Compression) on page 126 |
| Output Fields | When you enter this command, you are provided feedback on the status of your request. |

Sample Output

| | |
|--|--|
| file archive (Multiple Files) | <p>The following sample command archives all message files in the local directory <code>/var/log/messages</code> as the single file messages-archive.tar.</p> <pre>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></pre> |
| file archive (Single File) | <p>The following sample command archives one message file in the local directory <code>/var/log/messages</code> as the single file messages-archive.tar.</p> <pre>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</pre> |
| file archive (with Compression) | <p>The following sample command archives and compresses all message files in the local directory <code>/var/log/messages</code> as the single file messages-archive.tgz.</p> |


```
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">• Configuring Checksum Hashes for a Commit Script in the <i>Junos OS Configuration and Operations Automation Guide</i>• Configuring Checksum Hashes for an Event Script in the <i>Junos OS Configuration and Operations Automation Guide</i>• Configuring Checksum Hashes for an Op Script in the <i>Junos OS Configuration and Operations Automation Guide</i>• Executing an Op Script from a Remote Site in the <i>Junos OS Configuration and Operations Automation Guide</i>• file checksum sha-256 on page 130• file checksum sha1 on page 129• op |
| List of Sample Output | file checksum md5 on page 128 |
| 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"> Configuring Checksum Hashes for a Commit Script in the <i>Junos OS Configuration and Operations Automation Guide</i> Configuring Checksum Hashes for an Event Script in the <i>Junos OS Configuration and Operations Automation Guide</i> Configuring Checksum Hashes for an Op Script in the <i>Junos OS Configuration and Operations Automation Guide</i> Executing an Op Script from a Remote Site in the <i>Junos OS Configuration and Operations Automation Guide</i> file checksum md5 on page 128 file checksum sha-256 on page 130 op |
| List of Sample Output | file checksum sha1 on page 129 |
| 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">• Configuring Checksum Hashes for a Commit Script in the <i>Junos OS Configuration and Operations Automation Guide</i>• Configuring Checksum Hashes for an Event Script in the <i>Junos OS Configuration and Operations Automation Guide</i>• Configuring Checksum Hashes for an Op Script in the <i>Junos OS Configuration and Operations Automation Guide</i>• Executing an Op Script from a Remote Site in the <i>Junos OS Configuration and Operations Automation Guide</i>• file checksum md5 on page 128• file checksum sha1 on page 129• <code>op</code> |
| List of Sample Output | file checksum sha-256 on page 130 |
| 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 132</p> <p>file compare files context on page 132</p> <p>file compare files unified on page 132</p> <p>file compare files unified ignore-white-space on page 132</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  user@host> file compare files /tmp/one /tmp/two context
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  user@host> file compare files /tmp/one /tmp/two unified
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  user@host> file compare files /tmp/one /tmp/two unified ignore-white-space
unified            --- /tmp/one    Wed Dec  3 09:13:10 2003
ignore-white-space +++ /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 <i>address</i>></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 place to another on the local router or switch or between the local router or switch and a remote system. |
| Options | source —Source of the original file. Specify this as a URL or filename. destination —Destination of the copied file. Specify this as a URL or filename. If you are copying a file to the current directory (your home directory on the local router or switch) and are not renaming the file, specify the destination with a period (.). source-address <i>address</i> —(Optional) Source IP host address. This option is useful for specifying the source address of a secure copy (scp) file transfer. |
| Required Privilege Level | maintenance |
| List of Sample Output | file copy (A File from the Router or Switch to a PC) on page 134 file copy (A Configuration File Between Routing Engines) on page 134 file copy (A Log File Between Routing Engines) on page 134 file copy (A File from the TX Matrix Plus Router to a T1600 Router Connected to the TX Matrix Plus Router) on page 134 |
| Output Fields | When you enter this command, you are provided feedback on the status of your request. |

Sample Output

| | |
|---|---|
| file copy (A File from the Router or Switch to a PC) | <pre>user@host> file copy /var/tmp/rpd.core.4 berry:/c/junipero/tmp ...transferring.file..... 0 KB 0.3 kB/s ETA: 00:00:00 100%</pre> |
| file copy (A Configuration File Between Routing Engines) | <p>The following sample command copies a configuration file from Routing Engine 0 to Routing Engine 1:</p> <pre>user@host> file copy /config/juniper.conf re1:/var/tmp/copied-juniper.conf</pre> |
| file copy (A Log File Between Routing Engines) | <p>The following sample command copies a log file from Routing Engine 0 to Routing Engine 1:</p> <pre>user@host> file copy lcc0-re0:/var/log/chassisd lcc0-re1:/var/tmp</pre> |
| file copy (A File from the TX Matrix Plus Router to a T1600) | <p>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:</p> |

Router Connected to the TX Matrix Plus Router)

```
user@host> file copy sfc0-re1:/tmp/sample.txt lcc0-re1:/var/tmp
```

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 136 file delete (Routing Matrix) on page 136 |
| Output Fields | When you enter this command, you are provided feedback on the status of your request. |

Sample Output

| | |
|---|--|
| file delete | <pre>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</pre> |
| file delete (Routing Matrix) | <pre>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</pre> |

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 137 file list (Routing Matrix) on page 137 |
| Output Fields | When you enter this command, you are provided feedback on the status of your request. |

Sample Output

| | |
|-----------------------------------|--|
| file list | <pre>user@host> file list /var/tmp dcd.core rpd.core snmpd.core</pre> |
| file list (Routing Matrix) | <pre>user@host> file list lcc0-re0:var/tmp lcc0-re0: ----- /var/tmp/: .gdbinit .pccardd Test/ chassisd* chassisd.nathan* check_time* cores/ diagTestPrep* diagtest*</pre> |

```
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 139 file rename (Routing Matrix) on page 139 |
| Output Fields | When you enter this command, you are provided feedback on the status of your request. |

Sample Output

| | |
|-------------------------------------|---|
| file rename | <p>The following example lists the files in <code>/var/tmp</code>, renames one of the files, and then displays the list of files again to reveal the newly named file.</p> <pre> 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 </pre> |
| file rename (Routing Matrix) | <p>The following example lists the files in <code>/var/tmp</code>, renames one of the files, and then displays the list of files again to reveal the newly named file.</p> <pre> 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 </pre> |

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. <code>encoding (base64 raw)</code> —(Optional) Encode file contents with base64 encoding or show raw text. |
| Required Privilege Level | maintenance |
| List of Sample Output | file show on page 141 file show (Routing Matrix) on page 141 |
| 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 user@host> file show lcc0-re0:/var/tmp/gdbinit
(Routing Matrix) lcc0-re0:
-----
#####
# Settings
#####

set print pretty

#####
# Basic stuff
#####

define msgbuf
    printf "%s", msgbufp->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 8

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 192 |
| List of Sample Output | clear system commit on page 144 clear system commit (None Pending) on page 144 clear system commit (User Does Not Have Required Privilege Level) on page 144 |
| 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 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 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 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 for all T1600 routers (or line-card chassis) connected to the TX Matrix Plus router.</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 switches) (Optional) Clear all halt or reboot requests on the fabric control Routing Engines or fabric manager Routing Engines.

interconnect-device *name*—(QFabric switches) (Optional) Clear all halt or reboot requests on the Interconnect device.

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

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

Required Privilege Level maintenance

Related Documentation

- [request system reboot on page 169](#)
- request system reboot
- Rebooting and Halting a QFX Series Product

List of Sample Output

[clear system reboot on page 147](#)
[clear system reboot \(TX Matrix Router\) on page 147](#)
[clear system reboot \(QFX Series\) on page 147](#)

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 user@host> **clear system reboot**
(TX Matrix Router) scc-re0:

No shutdown/reboot scheduled.
lcc0-re0:

No shutdown/reboot scheduled.
lcc2-re0:

No shutdown/reboot scheduled.

clear system reboot user@switch> **clear system reboot node-group node1**
(QFX Series) No shutdown/reboot scheduled.

configure

| | |
|---------------------------------|---|
| Syntax | <code>configure</code> <code><dynamic></code> <code><exclusive></code> <code><private></code> |
| 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 Junos OS System Basics Configuration Guide . |
| Required Privilege Level | configure |
| Related Documentation | <ul style="list-style-type: none">• show configuration on page 188 |
| List of Sample Output | configure on page 148 |
| 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.



NOTE: The [edit system configuration] hierarchy is not available on QFabric switches.

Options This command has no options.

Required Privilege Level maintenance

Related Documentation

- [request system configuration rescue save on page 151](#)
- request system software rollback
- [show system commit on page 192](#)


List of Sample Output [request system configuration rescue delete on page 150](#)

Output Fields This command produces no output.

Sample Output

```
request system user@host> request system configuration rescue delete
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>  <p>NOTE: The [edit system configuration] hierarchy is not available on QFabric switches.</p> </div> |
| Options | This command has no options. |
| Required Privilege Level | maintenance |
| Related Documentation | <ul style="list-style-type: none"> request system software delete request system software rollback show system commit on page 192 |
| List of Sample Output | request system configuration rescue save on page 151 |
| Output Fields | This command produces no output. |

Sample Output

```
request system user@host> request system configuration rescue save
configuration rescue
save
```

request system halt

| | |
|---------------------------------------|---|
| Syntax | request system halt <at <i>time</i> > <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> > <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 halt <all-lcc lcc <i>number</i> scc> <at <i>time</i> > <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> > <both-routing-engines> <other-routing-engine> <in <i>minutes</i> > <media (compact-flash disk)> <message " <i>text</i> "> |
| Syntax (MX Series Router) | request system halt <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 halt <at <i>time</i> > |

```
<in minutes>
<media >
<message "text">
<slice slice>
```

Release Information Command introduced before Junos OS Release 7.4.
other-routing-engine option introduced in Junos OS Release 8.0.
 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 Stop the router or switch 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**—Stop the router or switch software immediately.

all-chassis—(TX Matrix and TX Matrix Plus routers only) (Optional) Halt all chassis.

all-lcc—(TX Matrix 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 routers (or line-card chassis) connected to the TX Matrix Plus router.

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

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.

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

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

local—(EX4200 switches and MX Series routers only) (Optional) 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 or 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. If you issue the **request system halt both-routing-engines** command on the TX Matrix or TX Matrix Plus router, all the Routing Engines on 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 | <ul style="list-style-type: none">• clear system reboot on page 145• request system power-off on page 165• Rebooting and Halting a QFX Series Product |
| List of Sample Output | request system halt on page 156 request system halt (In 2 Hours) on page 156 request system halt (Immediately) on page 156 request system halt (At 1:20 AM) on page 156 |
| 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">• Adding New Licenses (CLI Procedure) |
| List of Sample Output | request system license add on page 157 |
| Output Fields | When you enter this command, you are provided feedback on the status of your request. |

Sample Output

| | |
|---|--|
| <code>request system license add</code> | <code>user@host> request system license add terminal</code> |
|---|--|

request system license delete

| | |
|---------------------------------|--|
| Syntax | request system license delete <i>license-id</i> |
| Syntax (QFX Series) | request system license delete <i>license-identifier</i> |
| Release Information | Command introduced before Junos OS Release 7.4. Command introduced in Junos OS Release 9.0 for EX Series switches. Command introduced in Junos OS Release 11.1 for the QFX Series. |
| Description | Delete a license key. You can delete only one license at a time. |
| Options | <i>license-id</i> —License ID that uniquely identifies a license key. <i>license-identification</i> —(QFX Series) License ID that uniquely identifies a license key. |
| Required Privilege Level | maintenance |
| Related Documentation | <ul style="list-style-type: none">Deleting a License (CLI Procedure) |
| List of Sample Output | request system license delete on page 158 |
| Output Fields | When you enter this command, you are provided feedback on the status of your request. |

Sample Output

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


request system license save

| | |
|---------------------------------|--|
| Syntax | <code>request system license save (<i>filename</i> terminal)</code> |
| Release Information | Command introduced before Junos OS Release 7.4. Command introduced in Junos OS Release 9.0 for EX Series switches. Command introduced in Junos OS Release 11.1 for the QFX Series. |
| Description | Save installed license keys to a file or URL. |
| Options | <i>filename</i> —License key from a file or URL. Specify the filename or the URL where the key is located. <i>terminal</i> —License key from the terminal. |
| Required Privilege Level | maintenance |
| Related Documentation | <ul style="list-style-type: none">• Saving License Keys |
| List of Sample Output | request system license save on page 159 |
| Output Fields | When you enter this command, you are provided feedback on the status of your request. |

Sample Output

| | |
|--|---|
| <code>request system license save</code> | <code>user@host> request system license save ftp://user@host/license.conf</code> |
|--|---|

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">• Junos OS System Basics Configuration Guide |
| List of Sample Output | request system logout on page 160 |
| Output Fields | When you enter this command, you are provided feedback on the status of your request. |

Sample Output

| | |
|------------------------------|--|
| request system logout | <pre>user@host> request system logout user tammy all Connection closed by foreign host.</pre> |
|------------------------------|--|

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 (or line-card chassis) connected to the TX Matrix router. On a TX Matrix Plus router, abort a previously scheduled partition operation on all T1600 routers (or 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 T1600 router that is connected to the TX Matrix Plus router. Replace <i>number</i> with a value from 0 through 3.</p> <p>local—(MX Series routers only) (Optional) Abort a previously scheduled partition operation for the local Virtual Chassis member.</p> <p>member <i>member-id</i>—(MX Series routers only) (Optional) Abort a previously scheduled partition operation for the specified member of the Virtual Chassis configuration. Replace <i>member-id</i> with a value of 0 or 1.</p> <p>scc—(TX Matrix routers only) (Optional) Abort a previously scheduled partition operation on the TX Matrix router (or switch-card chassis).</p> |

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 163](#)

List of Sample Output [request system partition abort on page 162](#)

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 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 (or line-card chassis) 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 T1600 routers (or line-card connected to the TX Matrix Plus router).</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 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 T1600 router that is connected to the TX Matrix Plus router. Replace <i>number</i> with a value from 0 through 3.</p> <p>local—(MX Series routers only) (Optional) Schedule a partition of the hard disk for the local member of the Virtual Chassis.</p> <p>member <i>member-id</i>—(MX Series routers only) (Optional) Schedule a partition of the hard disk for the specified member of the Virtual Chassis configuration. Replace <i>member-id</i> with a value of 0 or 1.</p> <p>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).</p> |

sfc *number*—(TX Matrix Plus routers only) (Optional) Schedule a partition of the hard disk on the T1600 router connected to the TX Matrix Plus router (or switch-fabric chassis). 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 | <ul style="list-style-type: none">• request system partition abort on page 161 |
| List of Sample Output | request system partition hard-disk on page 164 |
| 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 T1600 router that is connected to the TX Matrix Plus router. Replace **number** with a value from 0 through 3.

local—(EX4200 switches and MX Series routers only) (Optional) 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 168 |
| 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 <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 reboot <all-members> <at <i>time</i> > <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> <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 reboot <all-chassis all-lcc lcc <i>number</i> sfc <i>number</i> > <other-routing-engine> <partition (1 2 alternate)> <at <i>time</i> > <in <i>minutes</i> > <media (compact-flash disk)> <message " <i>text</i> "> |
| Syntax (MX Series Router) | request system reboot <all-members> <at <i>time</i> > <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. other-routing-engine option added in Junos OS Release 8.0. 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 | Reboot the software. |

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

all-chassis—(TX Matrix and TX Matrix Plus routers only) (Optional) On a TX Matrix router, reboot all T640 routers (or line-card chassis) connected to the TX Matrix router. On a TX Matrix Plus router, reboot all T1600 routers (or line-card chassis) connected to the TX Matrix Plus router.

all-lcc—(TX Matrix and TX Matrix Plus routers only) (Optional) On a TX Matrix router, reboot all T640 routers (or line-card chassis) connected to the TX Matrix router. On a TX Matrix Plus router, reboot all T1600 routers (or line-card chassis) connected to the TX Matrix Plus router.

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.

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

lcc number—(TX Matrix and TX Matrix Plus routers only) (Optional) On a TX Matrix router, the number of a T640 router that is connected to the TX Matrix router. On a TX Matrix Plus router, the number of a T1600 router that is connected to the TX Matrix Plus router. Replace **number** with a value from 0 through 3.

local—(EX4200 switches and MX Series routers only) (Optional) 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 router (or 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 router (or 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: To reboot a router that has two Routing Engines, reboot the backup Routing Engine (if you have upgraded it) first, and then reboot the master Routing Engine.

| | |
|---------------------------------|---|
| Required Privilege Level | maintenance |
| Related Documentation | <ul style="list-style-type: none">• clear system reboot on page 145• request system halt on page 152• request system reboot• Rebooting and Halting a QFX Series Product |
| List of Sample Output | request system reboot on page 172 request system reboot (at 2300) on page 172 request system reboot (in 2 Hours) on page 172 request system reboot (Immediately) on page 172 request system reboot (at 1:20 AM) on page 172 |
| Output Fields | When you enter this command, you are provided feedback on the status of your request. |

Sample Output

| | |
|--|--|
| request system reboot | <pre>user@host> request system reboot Reboot the system ? [yes,no] (no)</pre> |
| request system reboot (at 2300) | <pre>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</pre> |
| request system reboot (in 2 Hours) | <p>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:</p> <pre>user@host> request system reboot at +120 user@host> request system reboot in 120 user@host> request system reboot at 19:00</pre> |
| request system reboot (Immediately) | <pre>user@host> request system reboot at now</pre> |
| request system reboot (at 1:20 AM) | <p>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.</p> <pre>user@host> request system reboot at 06060120 request system reboot at 120 Reboot the system at 120? [yes,no] (no) yes</pre> |

request system snapshot

| | |
|---------------------------------------|--|
| Syntax | request system snapshot <partition> |
| Syntax (EX Series Switches) | request system snapshot <all-members local member <i>member-id</i> > <media <i>type</i> > <partition> <re0 re1 routing-engine <i>routing-engine-id</i> > <slice (1 2 alternate)> |
| Syntax (J Series Routers) | request system snapshot <as-primary> <config-size <i>size</i> > <data-size <i>size</i> > <factory> <media <i>type</i> > <partition> <root-size <i>size</i> > <swap-size <i>size</i> > |
| Syntax (MX Series Router) | request system snapshot <all-members> <local> <member <i>member-id</i> > <partition> |
| Syntax (TX Matrix Router) | request system snapshot <all-chassis all-lcc lcc <i>number</i> scc> <partition> |
| Syntax (TX Matrix Plus Router) | request system snapshot <all-chassis all-lcc lcc <i>number</i> sfc <i>number</i> > <partition> |
| Release Information | Command introduced before Junos OS Release 7.4. Command introduced in Junos OS Release 10.0 for EX Series switches. |
| Description | <ul style="list-style-type: none"> 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 (/), /config, and /var 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—the complete contents of the root file system /, **/config** directory, and **/var** directory, which include the running Junos OS, the active configuration, and log files—and copy all these files onto an external drive. (If a USB flash drive is not connected, an error message is displayed.)

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

all-members | local | member member-id—(EX4200, EX4500, and EX8200 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-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 the media option is not specified, this is the default. 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**—(M320, T640, MX960, and J Series routers only) Copy software to the device connected to the USB port.

partition—(Optional) Repartition the flash drive before a snapshot occurs. If the partition table on the flash drive is corrupted, the request system snapshot command fails and reports errors. The partition option is only supported for restoring the software image from the hard drive to the flash drive.

(Routers only) You cannot issue the request system snapshot command when you enable flash disk mirroring. We recommend that you disable flash disk mirroring when you upgrade or downgrade the software. For more information, see the [Junos OS System Basics Configuration Guide](#).

re0 | re1 | routing-engine routing-engine-id—(EX8200 switch 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-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 (1 | 2 | *alternate*)—(EX Series switches only) (Optional) Take a snapshot of the active root partition and copy it to the selected 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 System Basics Configuration Guide](#).
- (TX Matrix and TX Matrix Plus router only) On a routing matrix, if you issue the **request system snapshot** command on the master Routing Engine, all the master Routing Engines connected to the routing matrix are backed up. If you issue this command on the backup Routing Engine, all the backup Routing Engines connected to the routing matrix are backed up.

Required Privilege Level maintenance

| | |
|-----------------------|--|
| Related Documentation | <ul style="list-style-type: none"> • show system snapshot on page 233 |
| List of Sample Output | request system snapshot (Routers) on page 177 request system snapshot (EX Series Switches) on page 177 request system snapshot (When Partition Flag Is On) on page 177 request system snapshot (When Mirroring Is Enabled) on page 177 request system snapshot all-lcc (Routing Matrix) on page 177 request system snapshot all-members (Virtual Chassis) on page 178 |
| Output Fields | When you enter this command, you are provided feedback on the status of your request. |

Sample Output

| | |
|--|---|
| request system snapshot (Routers) | <pre> 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 </pre> |
| request system snapshot (EX Series Switches) | <pre> user@switch> request system snapshot fpc0: ----- Verifying compatibility of destination media partitions... Running newfs (345MB) on external media / partition ... Running newfs (235MB) on external media /config partition ... The following filesystems were archived: / /config /var </pre> |
| request system snapshot (When Partition Flag Is On) | <pre> 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 </pre> |
| request system snapshot (When Mirroring Is Enabled) | <pre> user@host> request system snapshot Snapshot is not possible since mirror-flash-on-disk is configured. </pre> |
| request system snapshot all-lcc (Routing Matrix) | <pre> 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 </pre> |

**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 <i>package-name</i> <best-effort-load> <delay-restart> <force> <no-copy> <no-validate> <re0 re1> <reboot> <unlink> <validate> |
| Syntax (EX Series Switches) | request system software add <i>package-name</i> <best-effort-load> <delay-restart> <force> <no-copy> <no-validate> <re0 re1> <reboot> <set [<i>package-name package-name</i>]> <validate> |
| Syntax (TX Matrix Router) | request system software add <i>package-name</i> <best-effort-load> <delay-restart> <force> <lcc <i>number</i> scc> <no-copy> <no-validate> <re0 re1> <reboot> <unlink> <validate> |
| Syntax (TX Matrix Plus Router) | request system software add <i>package-name</i> <best-effort-load> <delay-restart> <force> <lcc <i>number</i> sfc <i>number</i> > <no-copy> <no-validate> <re0 re1> <reboot> <unlink> <validate> |
| Syntax (MX Series Router) | request system software add <i>package-name</i> <best-effort-load> <delay-restart> <force> <member <i>member-id</i> > <no-copy> |

| | |
|----------------------------|---|
| | <div><div><no-validate></div><div><re0 re1></div><div><reboot></div><div><unlink></div><div><validate></div></div> |
| Syntax (QFX Series) | <div>request system software add <i>package-name</i></div> <div><best-effort-load></div> <div><component (all director-group fabric node-group <i>name</i>)></div> <div><delay-restart></div> <div><force></div> <div><no-copy></div> <div><no-validate></div> <div><partition></div> <div><reboot></div> <div><unlink></div> <div><validate></div> |
| Release Information | <div>Command introduced before Junos OS Release 7.4.</div> <div>best-effort-load and unlink options added in Junos OS Release 7.4.</div> <div>Command introduced in Junos OS Release 9.0 for EX Series switches.</div> <div>sfc option introduced for the TX Matrix Plus router in Junos OS Release 9.6.</div> <div>Command introduced in Junos OS Release 11.1 for the QFX Series.</div> <div>The set [<i>package-name package-name</i>] option added in Junos OS Release 11.1 for EX Series switches.</div> |
| Description | Install a software package or bundle on the router or switch. |
| Options | <div><i>package-name</i>—Location from which the software package or bundle is to be installed.</div> <div>For example:</div> <ul style="list-style-type: none">• <i>/var/tmp/package-name</i>—For a software package or bundle that is being installed from a local directory on the router or switch.• <i>protocol://hostname/pathname/package-name</i>—For a software package or bundle that is to be downloaded and installed from a remote location. Replace <i>protocol</i> with one of the following:<ul style="list-style-type: none">• ftp—File Transfer Protocol. Use <i>ftp://hostname/pathname/package-name</i>. To specify authentication credentials, use <i>ftp://<username>:<password>@hostname/pathname/package-name</i>. 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 <i>http://hostname/pathname/package-name</i>. To specify authentication credentials, use <i>http://<username>:<password>@hostname/pathname/package-name</i>. 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.

all— (QFabric switches only) (Optional) Install the software package on all of the QFabric components.

best-effort-load— (Optional) Activate a partial load and treat parsing errors as warnings instead of errors.

component (all | director-group | fabric | node-group name)— (QFabric switches only) (Optional) Install software package on one or all of the QFabric components.

delay-restart— (Optional) Install software package or bundle, but do not restart software processes.

director-group— (QFabric switches only) (Optional) Install software package on the Director group and Fabric managers.

fabric— (QFabric switches only) (Optional) Install software package on the Interconnect devices and Fabric controls.

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

lcc *number*—(TX Matrix and TX Matrix Plus routers only) (Optional) In a routing matrix based on the TX Matrix router, install a software package or bundle on a T640 router (or line-card chassis) that is connected to the TX Matrix router. In a routing matrix based on the TX Matrix Plus router, install a software package or bundle on a T1600 router (or line-card chassis) that is connected to the TX Matrix Plus router. Replace ***number*** with a value from 0 through 3.

member *member-id*—(MX Series routers only) (Optional) Install a software package on the specified Virtual Chassis member. Replace ***member-id*** with a value of 0 or 1.

node-group *name*—(QFabric switches only) (Optional) Install software package on the server Node group or network Node group.

partition—(QFX3500 switches only) (Optional) Format and repartition the media before installation.

scc—(TX Matrix routers only) (Optional) Install a software package or bundle on a Routing Engine on a TX Matrix router (or switch-card chassis).

sfc *number*—(TX Matrix Plus routers only) (Optional) Install a software package or bundle on a Routing Engine on a TX Matrix Plus router (or switch-fabric chassis). Replace ***number*** with 0.

no-copy—(Optional) Install a software package or bundle, but do not save copies of 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 that support dual or redundant Routing Engines, load a software package or bundle on the Routing Engine in slot 0 (**re0**) or 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.

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.

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.

Additional Information



NOTE: The `request system snapshot` command is currently not supported on the QFX Series. Also, you cannot add or install multiple packages on a QFabric switch.

Before upgrading the software on the router or switch, when you have a known stable system, issue the `request system snapshot` command to back up the software, including the configuration, to the `/altroot` and `/altconfig` file systems. After you have upgraded the software on the router or switch and are satisfied that the new package or bundle is successfully installed and running, issue the `request system snapshot` command again to back up the new software to the `/altroot` and `/altconfig` file systems.

After you run the `request system snapshot` command, you cannot return to the previous version of the software, because the running and backup copies of the software are identical.

If you are upgrading more than one package at the same time, delete the operating system package, `jkernl`, last. Add the operating system package, `jkernl`, first and the routing software package, `jroute`, last. If you are upgrading all packages at once, delete and add them in the following order:

```
user@host> request system software add /var/tmp/jbase
user@host> request system software add /var/tmp/jkernl
user@host> request system software add /var/tmp/jpfe
user@host> request system software add /var/tmp/jdocs
user@host> request system software add /var/tmp/jroute
user@host> request system software add /var/tmp/jcrypto
```

By default, when you issue the `request system software add package-name` command on a TX Matrix master Routing Engine, all the T640 master Routing Engines that are connected to it are upgraded to the same version of software. If you issue the same command on the TX Matrix backup Routing Engine, all the T640 backup Routing Engines that are connected to it are upgraded to the same version of software.

Likewise, when you issue the `request system software add package-name` command on a TX Matrix Plus master Routing Engine, all the T1600 master Routing Engines that are connected to it are upgraded to the same version of software. If you issue the same command on the TX Matrix Plus backup Routing Engine, all the T1600 backup Routing Engines that are connected to it are upgraded to the same version of software.

Required Privilege Level

maintenance

Related Documentation

- request system software delete
- request system software rollback
- request system storage cleanup
- Upgrading Software on a QFX3500 Switch
- Upgrading Software on a QFabric System

List of Sample Output [request system software add validate on page 184](#)
[request system software add \(Mixed EX4200 and EX4500 Virtual Chassis\) on page 184](#)
[request system software add \(QFabric Switch\) on page 185](#)

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 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]
```

EX4200 and EX4500 ...
Virtual Chassis)

```
request system user@switch> request system software add /pbdata/packages/jinstall-qfabric-11.3X30.6.rpm
software add (QFabric component all reboot
Switch) ...
```


CHAPTER 9

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. |
| Required Privilege Level | view |
| Related Documentation | <ul style="list-style-type: none"> • Displaying the Current Junos OS Configuration • Overview of Junos OS CLI Operational Mode Commands |
| List of Sample Output | show configuration on page 189 show configuration policy-options on page 190 |
| 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 user@host> show configuration policy-options
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 191 |

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 pending commit operation (if any) and the commit history. |
| Options | This command has no options. |
| Required Privilege Level | view |
| Related Documentation | <ul style="list-style-type: none"> • clear system commit on page 144 |
| List of Sample Output | show system commit on page 193 show system commit (At a Particular Time) on page 193 show system commit (At the Next Reboot) on page 193 show system commit (Rollback Pending) on page 193 show system commit (QFX Series) on page 193 |
| Output Fields | Table 6 on page 192 describes the output fields for the show system commit command. Output fields are listed in the approximate order in which they appear. |

Table 6: show system commit Output Fields

| Field Name | Field Description |
|-----------------------|--|
| Commit history | Displays the last 50 commit operations listed, most recent to first. The identifier rescue designates a configuration created for recovery using the request system configuration rescue save command. |
| Timestamp | Date and time of the commit operation. |
| Username | User who executed the commit operation. |
| Commit method | Method used to execute the commit operation: <ul style="list-style-type: none"> • cli—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—A method other than those identified was used to perform the commit operation. |

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 user@host> show system commit
(At a Particular Time) commit requested by root via cli at Tue May 7 15:59:00 2002

show system commit user@host> show system commit
(At the Next Reboot) commit requested by root via cli at reboot

show system commit user@host> show system commit
(Rollback Pending) 0 2005-01-05 15:00:37 PST by root via cli commit confirmed, rollback in 3mins

show system commit user@switch> show system commit
(QFX Series) 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 switches.
.....

Options This command has no options.


Required Privilege Level maintenance

List of Sample Output [show system configuration archival on page 194](#)

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. |
| | <div>  <p>NOTE: The [edit system configuration] hierarchy is not available on QFabric switches.</p> </div> |
| Options | This command has no options. |
| Required Privilege Level | maintenance |
| Related Documentation | <ul style="list-style-type: none"> • show system configuration archival on page 194 |
| List of Sample Output | show system configuration rescue on page 195 |

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 Routers) | <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 **none**—Display standard information about system processes.

brief | detail | extensive | summary—(Optional) Display the specified level of detail.

all-chassis—(TX Matrix 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 routers (in a routing matrix based on the TX Matrix Plus router) in the chassis.

all-lcc—(TX Matrix and TX Matrix Plus routers 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 T1600 routers (or line-card chassis) connected to the TX Matrix Plus router.

all-members—(EX4200 switches and MX Series routers only) (Optional) Display standard system process information for all members of the Virtual Chassis configuration.

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 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 T1600 router that is connected to the TX Matrix Plus router. Replace *number* with a value from 0 through 3.

local—(EX4200 switches and MX Series routers only) (Optional) 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 (lrnuxd), 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.

sbcc-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 (or switch-fabric chassis). 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 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

Related Documentation

- List of Junos OS Processes

List of Sample Output

- [show system processes on page 204](#)
- [show system processes brief on page 204](#)
- [show system processes detail on page 204](#)
- [show system processes extensive on page 205](#)
- [show system processes lcc wide \(TX Matrix Routing Matrix\) on page 206](#)
- [show system processes summary on page 206](#)
- [show system processes \(TX Matrix Plus Router\) on page 207](#)
- [show system processes sfc \(TX Matrix Plus Router\) on page 214](#)
- [show system processes lcc wide \(TX Matrix Plus Routing Matrix\) on page 216](#)
- [show system processes \(QFX Series\) on page 218](#)

Output Fields [Table 7 on page 202](#) describes the output fields for the **show system processes** command. Output fields are listed in the approximate order in which they appear.

Table 7: 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 7: 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 7: 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 |

Sample Output

```

show system user@host> show system processes
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/tinetd -N
  191  ??  S       2:24.76  /sbin/ift -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 user@host> show system processes brief
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 user@host> show system processes detail
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 user@host> show system processes extensive
processes extensive last pid: 544; load averages: 0.00, 0.00, 0.00 18:30:33
37 processes: 1 running, 36 sleeping

```

Mem: 25M Active, 3968K 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 |
|-----|----------|-----|------|-------|--------|--------|------|-------|-------|--------------|
| 544 | root | 30 | 0 | 604K | 768K | RUN | 0:00 | 0.00% | 0.00% | top |
| 3 | root | 28 | 0 | 0K | 12K | psleep | 0:00 | 0.00% | 0.00% | vmdaemon |
| 4 | root | 28 | 0 | 0K | 12K | update | 0:03 | 0.00% | 0.00% | update |
| 528 | aviva | 18 | 0 | 660K | 948K | pause | 0:00 | 0.00% | 0.00% | tcsh |
| 204 | root | 18 | 0 | 300K | 544K | pause | 0:00 | 0.00% | 0.00% | csh |
| 131 | root | 18 | 0 | 332K | 532K | pause | 0:00 | 0.00% | 0.00% | cron |
| 186 | root | 18 | 0 | 196K | 68K | pause | 0:00 | 0.00% | 0.00% | watchdog |
| 27 | root | 10 | 0 | 512M | 16288K | mfsidl | 0:00 | 0.00% | 0.00% | mount_mfs |
| 1 | root | 10 | 0 | 620K | 344K | wait | 0:00 | 0.00% | 0.00% | init |
| 304 | root | 3 | 0 | 884K | 900K | ttyin | 0:00 | 0.00% | 0.00% | bash |
| 200 | root | 3 | 0 | 180K | 540K | ttyin | 0:00 | 0.00% | 0.00% | getty |
| 203 | root | 3 | 0 | 180K | 540K | ttyin | 0:00 | 0.00% | 0.00% | getty |
| 202 | root | 3 | 0 | 180K | 540K | ttyin | 0:00 | 0.00% | 0.00% | getty |
| 201 | root | 3 | 0 | 180K | 540K | ttyin | 0:00 | 0.00% | 0.00% | getty |
| 194 | root | 2 | 0 | 2248K | 1640K | select | 0:11 | 0.00% | 0.00% | rpdp |
| 205 | root | 2 | 0 | 964K | 800K | select | 0:12 | 0.00% | 0.00% | tnp.chassisd |
| 189 | root | 2 | -12 | 352K | 740K | select | 0:03 | 0.00% | 0.00% | xntpd |
| 114 | root | 2 | 0 | 296K | 612K | select | 0:00 | 0.00% | 0.00% | amd |
| 188 | root | 2 | 0 | 780K | 600K | select | 0:00 | 0.00% | 0.00% | dcd |
| 527 | root | 2 | 0 | 176K | 580K | select | 0:00 | 0.00% | 0.00% | rlogind |
| 195 | root | 2 | 0 | 212K | 552K | select | 0:00 | 0.00% | 0.00% | inetd |
| 187 | root | 2 | 0 | 192K | 532K | select | 0:00 | 0.00% | 0.00% | tnetd |
| 83 | root | 2 | 0 | 188K | 520K | select | 0:00 | 0.00% | 0.00% | syslogd |
| 538 | root | 2 | 0 | 1324K | 516K | select | 0:00 | 0.00% | 0.00% | mgd |
| 99 | daemon | 2 | 0 | 176K | 492K | select | 0:00 | 0.00% | 0.00% | portmap |
| 163 | root | 2 | 0 | 572K | 420K | select | 0:00 | 0.00% | 0.00% | nsrexecd |

```

192 root      2    0   560K   400K select  0:10  0.00%  0.00% snmpd
191 root      2    0  1284K   376K select  0:00  0.00%  0.00% mgd
537 aviva     2    0   636K   364K select  0:00  0.00%  0.00% cli
193 root      2    0   312K   204K select  0:07  0.00%  0.00% mib2d
  5 root      2    0      0K    12K pfesel  0:00  0.00%  0.00% if_pfe
  2 root     -18   0      0K    12K psleep  0:00  0.00%  0.00% pagedaemon
  0 root     -18   0      0K     0K sched  0:00  0.00%  0.00% swapper

```

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/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 0:25.07 /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/apspd -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 [vnlru]
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.sntpd -N
1534 ?? I 0:00.00 /usr/sbin/tnp.sntpc -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 [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 0:03.40 [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 [vnlru]
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 [vnlru]
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/apspd -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/mpiisoamd -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/pfed -N
45747 ?? S 0:00.19 /usr/sbin/lpdfd -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 user@host> show system processes lcc 2 wide
processes lcc wide (TX 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 -jpw
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 [vnlr_u_mem]
63 ?? DL      1:51.66 [syncer]
64 ?? DL      0:20.22 [vnlr_u]
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.snmpd -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 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 routers in the chassis that are connected the TX Matrix Plus router.</p> <p>all-lcc—(TX Matrix and TX Matrix Plus routers only) (Optional) Display system queue statistics for all LCC chassis attached to the TX Matrix or TX Matrix Plus routers.</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 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 T1600 router that is connected to the TX Matrix Plus router. Replace <i>number</i> with a value from 0 through 3.</p> <p>local—(MX Series routers only) (Optional) Display system queue statistics for the local Virtual Chassis member.</p> <p>member <i>member-id</i>—(MX Series routers only) (Optional) Display system queue statistics for the specified member of the Virtual Chassis configuration. Replace <i>member-id</i> with a value of 0 or 1.</p> <p>scc—(TX Matrix routers only) (Optional) Display queue statistics for the TX Matrix router.</p> <p>sfc <i>number</i>—(TX Matrix Plus routers only) (Optional) Display system queue statistics for the TX Matrix Plus router (or switch-fabric chassis). Replace <i>number</i> with 0.</p> |

Additional Information By default, when you issue the **show system queues** 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 router) backup Routing Engines that are connected to it.

Required Privilege Level maintenance

List of Sample Output [show system queues on page 223](#)
[show system queues scc \(TX Matrix Router\) on page 223](#)
[show system queues sfc \(TX Matrix Router\) on page 224](#)

Output Fields [Table 8 on page 223](#) lists the output fields for the **show system queues** command. Output fields are listed in the approximate order in which they appear.

Table 8: 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

```

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

```

```

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 | 125000 | 0 | 416 | 0 |
| so-1/1/0 | 0 | 125000 | 0 | 416 | 0 |
| so-21/0/0 | 0 | 125000 | 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 | 125000 | 0 | 416 | 0 |
| so-0/0/0 | 0 | 125000 | 0 | 416 | 0 |
| so-0/1/0 | 0 | 125000 | 0 | 416 | 0 |
| so-0/2/0 | 0 | 125000 | 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 | 125000 | 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 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 |
| fr1miq | 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 | none —Display pending reboots or halts on the active Routing Engine. all-chassis —(TX Matrix 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 routers in the chassis that are connected to the TX Matrix Plus router. all-members —(EX4200 switches and MX Series routers only) (Optional) Display halt or reboot request information for all members of the Virtual Chassis configuration. all-lcc —(TX Matrix and TX Matrix Plus routers only) (Optional) On a TX Matrix router, display system halt or reboot request information for all T640 routers (or line-card chassis) connected to the TX Matrix router. On a TX Matrix Plus router, display halt |

or reboot request information for all T1600 routers (or line-card chassis) connected to the TX Matrix Plus router

both-routing-engines—(Systems with multiple Routing Engines) (Optional) Display halt or reboot request information on both Routing Engines.

infrastructure *name*—(QFabric switches only) (Optional) Display reboot request information on the fabric manager Routing Engines and fabric control Routing Engines.

interconnect-device *name*—(QFabric switches only) (Optional) Display reboot request information on the Interconnect device.

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

local—(EX4200 switches and MX Series routers only) (Optional) 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 switches 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 (or switch-fabric chassis).

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

List of Sample Output [show system reboot on page 230](#)
[show system reboot all-lcc \(TX Matrix Router\) on page 230](#)
[show system reboot sfc \(TX Matrix Plus Router\) on page 230](#)
[show system reboot \(QFX3500 Switch\) on page 230](#)

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 user@host> show system reboot all-lcc
all-lcc (TX Matrix 1cc0-re0:
Router) -----
No shutdown/reboot scheduled.
```


```
1cc2-re0:
-----
```

```
No shutdown/reboot scheduled.
```

```
show system reboot user@host> show system sfc 0
sfc (TX Matrix Plus No shutdown/reboot scheduled.
Router)
```

```
show system reboot user@switch> show system reboot
(QFX3500 Switch) 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. |
| |  <p>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.</p> |
| 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 231 |

Sample Output

```

show system rollback user@host> show system rollback 3 compare 1
compare [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)> <slice (1 2 alternate)> |
| Release Information | Command introduced in Junos OS Release 7.6. Command introduced in Junos OS Release 10.0 for EX Series switches. |
| Description | Display information about the backup software: <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 /, /config directory, and /var directory, which are located either on an external USB flash drive or in internal flash memory. |



NOTE: To back up software, use the **request system snapshot** command.

| | |
|----------------|--|
| Options | <p>none—Display information about the backup software.</p> <p>all-members local member <i>member-id</i>—(EX4200 switch and EX4200, EX4500, and EX8200 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> <p>slice (1 2 alternate)—(EX Series switch only) Display the snapshot in a specific partition:</p> <ul style="list-style-type: none"> 1—Display the snapshot in partition 1. 2—Display the snapshot in partition 2. alternate—Display the snapshot in the alternate partition, which is the partition that did not boot the switch at the last bootup. |
|----------------|--|

| | |
|--------------------------|---|
| Required Privilege Level | view |
| Related Documentation | <ul style="list-style-type: none"> request system snapshot on page 173 |
| List of Sample Output | show system snapshot (Router) on page 234 show system snapshot media external (Switch) on page 234 show system snapshot media internal (Switch) on page 234 show system snapshot media internal slice 2 (Switch) on page 235 |
| Output Fields | Table 9 on page 234 lists the output fields for the show system snapshot command. Output fields are listed in the approximate order in which they appear. |

Table 9: 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) | <pre> 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 </pre> |
| show system snapshot media external (Switch) | <pre> user@switch> show system snapshot media external Information for snapshot on external (da1s1) Creation date: Oct 13 20:23:23 2009 JUNOS version on snapshot: jbase : 10.0I20090726_0011_user jcrypto-ex: 10.0I20090726_0011_user jdocs-ex: 10.0I20090726_0011_user jkernel-ex: 10.0I20090726_0011_user jroute-ex: 10.0I20090726_0011_user jswitch-ex: 10.0I20090726_0011_user jweb-ex: 10.0I20090726_0011_user jpfe-ex42x: 10.0I20090726_0011_user </pre> |
| show system snapshot media internal (Switch) | <pre> 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 </pre> |

```

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 snapshot user@switch> show system snapshot media internal slice 2
media internal slice 2 Information for snapshot on internal (/dev/da0s2a) (primary)
(Switch) 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 | none —Display standard information about all loaded Junos OS extensions. all-chassis —(TX Matrix and TX Matrix Plus routers only) (Optional) Display system software information for all the T640 routers (TX Matrix Router) or all the T1600 routers (TX Matrix Plus Router) in the chassis. all-lcc —(TX Matrix and TX Matrix Plus routers only) (Optional) On a TX Matrix router, display system software information for all T640 routers (or line-card chassis) connected to the TX Matrix router. On a TX Matrix Plus router, display system software information for all T1600 routers (or line-card chassis) connected to the TX Matrix Plus router all-members —(EX4200 switches only) (Optional) Display the system software running on all members of the Virtual Chassis configuration. |

backup—(J Series routers only) (Optional) Display the status of old system software packages only.

detail—(Optional) Display detailed information about available Junos OS extensions.

infrastructure *name*—(QFabric switches only) (Optional) Display the system software running on the fabric control Routing Engine and the fabric manager Routing Engine.

interconnect-device *name*—(QFabric switches only) (Optional) Display the system software running on the Interconnect device.

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

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 switches 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 (or switch-fabric chassis).

Required Privilege Level maintenance

List of Sample Output [show system software on page 237](#)
[show system software \(TX Matrix Plus Router\) on page 238](#)
[show system software \(QFX Series\) on page 242](#)

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
(TX Matrix Plus
Router)

user@host> show system software
sfc0-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-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 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]

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 T1600 routers (or 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 T1600 router that is connected to the TX Matrix Plus router. Replace **number** with a value from 0 through 3.

local—(EX4200 switches and MX Series routers only) (Optional) 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 246](#)
[show system statistics \(EX Series Switches\) on page 253](#)
[show system statistics \(TX Matrix Router\) on page 262](#)
[show system statistics \(QFX Series\) on page 268](#)

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
c1n1:
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 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 user@host> **show system statistics**
(EX Series Switches) 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 IGMP2 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 IGMP2 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 may 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 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 unseqnt 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
```

1cc1-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

```

1cc3-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 user@switch> show system statistics
(QFX Series)          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 may 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 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 (TX Matrix Router) | show system storage <detail> <all-chassis all-lcc lcc <i>number</i> scc> |
| Syntax (TX Matrix Plus Router) | show system storage <detail> <all-chassis all-lcc lcc <i>number</i> sfc <i>number</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> > |
| 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 and TX Matrix Plus routers only) (Optional) Display system storage statistics 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 storage statistics for all T640 routers (or line-card chassis) connected to the TX Matrix router. On a TX Matrix Plus router, display system storage statistics for all T1600 routers (or line-card chassis) 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 switches only) (Optional) Display system storage statistics for the fabric control Routing Engines or fabric manager Routing Engines.

interconnect-device *name*—(QFabric switches only) (Optional) Display system storage statistics for the Interconnect device.

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

local—(EX4200 switches and MX Series routers only) (Optional) 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 switches 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 (or switch-fabric chassis). Replace ***number*** with 0.

Additional Information By default, when you issue the **show system storage** 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 (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 (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 system storage on page 280](#)
[show system storage \(TX Matrix Plus Router\) on page 280](#)
[show system storage \(QFX3500 Switch\) on page 282](#)

Output Fields [Table 10 on page 280](#) describes the output fields for the **show system storage** command. Output fields are listed in the approximate order in which they appear.

Table 10: 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 user@host> show system storage
(TX Matrix Plus   sfc0-re0:
Router)
-----
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 routers (or line-card chassis) in the routing matrix.

Options **all-chassis**—(TX Matrix 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 routers configured in the routing matrix.

all-lcc—(TX Matrix 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 T1600 routers (or line-card chassis) connected to the TX Matrix Plus router.

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 and TX Matrix Plus router only) (Optional) On a TX Matrix router, display graceful Routing Engine switchover information for a specific T640 router (or line-card chassis) connected to the TX Matrix router. On a TX Matrix Plus router, display graceful Routing Engine switchover information for a specific T1600 router (or line-card chassis) connected to the TX Matrix Plus router. Replace ***number*** with 0.

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 router only) (Optional) Display graceful Routing Engine switchover information for the TX Matrix Plus router (or switch-fabric chassis).

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 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

List of Sample Output [show system switchover \(Backup Routing Engine\) on page 286](#)
[show system switchover all-lcc \(Routing Matrix\) on page 286](#)

Output Fields Table 11 on page 286 describes the output fields for the **show system switchover** command. Output fields are listed in the approximate order in which they appear.

Table 11: 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 /var/log/ksyncd 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 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 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 T1600 routers (or line-card chassis) connected to the TX Matrix Plus router. 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 switches only) (Optional) Show time since the system rebooted and processes started on the Director group.

infrastructure *name*—(QFabric switches 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 switches 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 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 T1600 router that is connected to the TX Matrix Plus router. Replace ***number*** with a value from 0 through 3.

local—(EX4200 switches and MX Series routers only) (Optional) 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 switches 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 (or switch-fabric chassis). Replace ***number*** with 0.

Additional Information By default, when you issue the **show system uptime** 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 (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 (in a routing matrix based on a TX Matrix Plus router) backup Routing Engines that are connected to it.

Required Privilege Level view

- Related Documentation**
- [Monitoring System Process Information](#)
 - [Monitoring System Properties](#)
 - [10-Gigabit Ethernet LAN/WAN PIC with XFP \(T640 Router\)](#)

List of Sample Output

- [show system uptime on page 290](#)
- [show system uptime all-lcc \(TX Matrix Router\) on page 290](#)
- [show system uptime all-lcc \(TX Matrix Plus Router\) on page 291](#)
- [show system uptime \(QFX Series\) on page 291](#)

Output Fields [Table 12 on page 290](#) describes the output fields for the **show system uptime** command. Output fields are listed in the approximate order in which they appear.

Table 12: 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  user@host> show system uptime all-lcc
all-lcc (TX Matrix  lcc0-re0:
Router) -----
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 | none —Display kernel dynamic memory usage information. all-chassis —(TX Matrix and TX Matrix Plus routers only) (Optional) Display kernel dynamic memory usage information for all chassis. all-lcc —(TX Matrix and TX Matrix Plus routers only) (Optional) On a TX Matrix router, display kernel dynamic memory usage information for all T640 routers (or line-card chassis) connected to the TX Matrix router. On a TX Matrix Plus router, display kernel dynamic memory usage information for all T1600 routers (or line-card chassis) connected to the TX Matrix Plus router. all-members —(EX4200 switches and MX Series routers only) (Optional) Display kernel dynamic memory usage information for all members of the Virtual Chassis configuration. |

infrastructure *name*—(QFabric switches only) (Optional) Display kernel dynamic memory usage information for the fabric control Routing Engine and fabric manager Routing Engine.

interconnect-device *name*—(QFabric switches only) (Optional) Display kernel dynamic memory usage information for the Interconnect device.

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

local—(EX4200 switches and MX Series routers only) (Optional) 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 switches 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 (or switch-fabric chassis). Replace ***number*** with 0.

Additional Information By default, when you issue the **show system virtual-memory** 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 (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 (in a routing matrix based on a TX Matrix Plus router) backup Routing Engines that are connected to it.



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 |
| List of Sample Output | show system virtual-memory on page 296 show system virtual-memory scc (TX Matrix Router) on page 300 show system virtual-memory sfc (TX Matrix Plus Router) on page 301 show system virtual-memory display xml on page 304 show system virtual-memory (QFX Series) on page 326 |
| Output Fields | Table 13 on page 295 lists the output fields for the show system virtual-memory command. Output fields are listed in the approximate order in which they appear. |

Table 13: 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 13: 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, NQNFS 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 |

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  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
16,32,64,128,256,512,1024,2048,4096,8192,16384,32768,65536,131072
      ip6ndp      0    0K      -         4    64
      in6ifmulti  1    1K      -         1    64
      in6grentry  1    1K      -         1    64
      iflogical   20    5K      -        29 2048
      iffamily    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
      rtmsg       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
        sysctluid 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
        iffamilly 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

```



```

    rtmsg      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
    sysctluid 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      0K      -    532 16,32,32768,131072
    NULLFS hash  1      1K      -      1 64
    taskqueue    5      1K      -      5 64
    turnstiles  127     8K      -    127 64
    Unitno       6      1K      -      4 16,64
    ioctlops     0      0K      - 1771718 16,32,64,128,8192,16384,65536,131072

    iov         0      0K      -   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      0K      -      55 32,64
    VFS hash     1   256K      -      1 32,64
    vnode        1      1K      -      1 512
    mount       266   21K      -    481 16,32,64,128,256,4096,32768
    vnode        0      0K      -   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      0K      -     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 | 0K | - | 19 | 64 |
| allocdirect | 0 | 0K | - | 326 | 128 |
| freefrag | 0 | 0K | - | 31 | 32 |
| freeblks | 0 | 0K | - | 103 | 2048 |
| freefile | 0 | 0K | - | 175 | 32 |
| diradd | 0 | 0K | - | 590 | 64 |
| mkdir | 0 | 0K | - | 166 | 32 |
| dirrem | 0 | 0K | - | 382 | 32 |
| savedino | 0 | 0K | - | 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 Kegs: | 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>
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<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>
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<memuse>0</memuse>
<high-use>--</high-use>
<memstat-req>4</memstat-req>
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<memstat-name>in6ifmulti</memstat-name>
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<memuse>1</memuse>
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<memstat-size>64,2048</memstat-size>
<memstat-name>iffamily</memstat-name>
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<memstat-name>rtnextthop</memstat-name>
<inuse>127</inuse>
<memuse>18</memuse>
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<memstat-req>129</memstat-req>
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<memstat-name>metrics</memstat-name>

```

```
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<memstat-name>inifmulti</memstat-name>
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<memuse>1</memuse>
<high-use>--</high-use>
<memstat-req>3</memstat-req>
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<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>
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<memuse>8</memuse>
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<memuse>1</memuse>
<high-use>--</high-use>
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<memstat-size>16</memstat-size>
<memstat-name>ifstat</memstat-name>
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<memstat-name>ipfw</memstat-name>
<inuse>42</inuse>
<memuse>23</memuse>
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<memuse>14</memuse>
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<memstat-name>sysctl</memstat-name>
```

```

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<memstat-name>mkey</memstat-name>
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<memstat-name>ifstate</memstat-name>
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<memstat-name>itable16</memstat-name>
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<memstat-name>lr</memstat-name>
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<memstat-name>pic</memstat-name>
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<high-use>--</high-use>
<memstat-req>5</memstat-req>

```

```
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<memstat-name>pfestat</memstat-name>
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<memstat-name>jsr</memstat-name>
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<high-use>--</high-use>
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<memstat-name>module</memstat-name>
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<memuse>16</memuse>
<high-use>--</high-use>
<memstat-req>249</memstat-req>
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<memstat-name>mtx_pool</memstat-name>
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<memuse>8</memuse>
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<memstat-name>DEVFS3</memstat-name>
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<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>
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<memstat-name>pgrp</memstat-name>
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<memuse>1</memuse>
<high-use>--</high-use>
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```

```

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<high-use>--</high-use>
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<memstat-name>proc</memstat-name>
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<memstat-name>cred</memstat-name>
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<memstat-name>sysctltmp</memstat-name>
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<memuse>0</memuse>
<high-use>--</high-use>
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<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>

```

```
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<memuse>33</memuse>
<high-use>--</high-use>
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<memstat-name>eventhandler</memstat-name>
<inuse>35</inuse>
<memuse>2</memuse>
<high-use>--</high-use>
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<memstat-name>kobj</memstat-name>
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<memstat-req>111</memstat-req>
<memstat-size>65536</memstat-size>
<memstat-name>DEVFS</memstat-name>
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<high-use>--</high-use>
<memstat-req>9</memstat-req>
<memstat-size>16,64</memstat-size>
<memstat-name>rman</memstat-name>
<inuse>71</inuse>
<memuse>5</memuse>
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    <zero-fill-pages-prezeroed>70061</zero-fill-pages-prezeroed>
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  <pages-affected-by-rfork>0</pages-affected-by-rfork>
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  <pages-freed-by-daemon>0</pages-freed-by-daemon>
  <pages-freed-by-exiting-proc>75630</pages-freed-by-exiting-proc>
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```

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  <intr-cnt>1140</intr-cnt>
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</system-virtual-memory-information>
<cli>
  <banner></banner>
</cli>
</rpc-reply>

```

```

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">
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      <memstat-name>linker</memstat-name>
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      <high-use>-</high-use>
      <memstat-req>1145</memstat-req>
    
```



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```



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<memstat-name>UFS mount</memstat-name>

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<memstat-name>zombie</memstat-name>
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<memuse>1</memuse>
<high-use>--</high-use>
<memstat-req>2</memstat-req>
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<memuse>1</memuse>
<high-use>--</high-use>
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<memuse>10</memuse>
<high-use>--</high-use>
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<memstat-name>kbdmux</memstat-name>
<inuse>5</inuse>
<memuse>9</memuse>

```

```
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<memstat-req>5</memstat-req>
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</vmstat-memstat-malloc>
<vmstat-memstat-zone>
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  <count-limit>0</count-limit>
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  <free>1</free>
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  <zone-size>120</zone-size>
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  <free>19</free>
  <zone-req>71</zone-req>
  <zone-name>UMA Slabs:</zone-name>
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  <count-limit>0</count-limit>
  <used>490</used>
  <free>41</free>
  <zone-req>579</zone-req>
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  <zone-size>104</zone-size>
  <count-limit>0</count-limit>
  <used>276</used>
  <free>20</free>
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  <zone-name>UMA Hash:</zone-name>
  <zone-size>128</zone-size>
  <count-limit>0</count-limit>
  <used>4</used>
  <free>26</free>
  <zone-req>5</zone-req>
  <zone-name>16 Bucket:</zone-name>
  <zone-size>76</zone-size>
  <count-limit>0</count-limit>
  <used>30</used>
  <free>20</free>
  <zone-req>30</zone-req>
  <zone-name>32 Bucket:</zone-name>
  <zone-size>140</zone-size>
  <count-limit>0</count-limit>
  <used>33</used>
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  <zone-req>33</zone-req>
  <zone-name>64 Bucket:</zone-name>
  <zone-size>268</zone-size>
  <count-limit>0</count-limit>
  <used>33</used>
  <free>9</free>
  <zone-req>33</zone-req>
  <zone-name>128 Bucket:</zone-name>
  <zone-size>524</zone-size>
  <count-limit>0</count-limit>
  <used>49</used>
  <free>0</free>
  <zone-req>49</zone-req>
  <zone-name>VM OBJECT:</zone-name>
  <zone-size>128</zone-size>
```

```

<count-limit>0</count-limit>
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<count-limit>0</count-limit>
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<used>238</used>
<free>57</free>
<zone-req>238</zone-req>
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<count-limit>0</count-limit>
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<zone-size>32</zone-size>
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<zone-size>64</zone-size>
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<zone-size>96</zone-size>
<count-limit>0</count-limit>

```

```
<used>2062</used>
<free>58</free>
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<zone-size>128</zone-size>
<count-limit>0</count-limit>
<used>359</used>
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<zone-name>224:</zone-name>
<zone-size>224</zone-size>
<count-limit>0</count-limit>
<used>422</used>
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<zone-name>256:</zone-name>
<zone-size>256</zone-size>
<count-limit>0</count-limit>
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<used>2</used>
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<count-limit>0</count-limit>
<used>49</used>
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<zone-name>1024:</zone-name>
<zone-size>1024</zone-size>
<count-limit>0</count-limit>
<used>213</used>
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<zone-name>4096:</zone-name>
<zone-size>4096</zone-size>
<count-limit>0</count-limit>
<used>144</used>
```



```
<free>7</free>
<zone-req>2249</zone-req>
<zone-name>Files:</zone-name>
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<used>665</used>
<free>77</free>
<zone-req>16457</zone-req>
<zone-name>MAC labels:</zone-name>
<zone-size>20</zone-size>
<count-limit>0</count-limit>
<used>3998</used>
<free>227</free>
<zone-req>21947</zone-req>
<zone-name>PROC:</zone-name>
<zone-size>544</zone-size>
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<used>116</used>
<free>10</free>
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<zone-name>THREAD:</zone-name>
<zone-size>416</zone-size>
<count-limit>0</count-limit>
<used>127</used>
<free>17</free>
<zone-req>131</zone-req>
<zone-name>KSEGRP:</zone-name>
<zone-size>88</zone-size>
<count-limit>0</count-limit>
<used>127</used>
<free>73</free>
<zone-req>131</zone-req>
<zone-name>UPCALL:</zone-name>
<zone-size>44</zone-size>
<count-limit>0</count-limit>
<used>0</used>
<free>0</free>
<zone-req>0</zone-req>
<zone-name>SLEEPQUEUE:</zone-name>
<zone-size>32</zone-size>
<count-limit>0</count-limit>
<used>145</used>
<free>194</free>
<zone-req>145</zone-req>
<zone-name>VMSPACE:</zone-name>
<zone-size>268</zone-size>
<count-limit>0</count-limit>
<used>57</used>
<free>13</free>
<zone-req>1335</zone-req>
<zone-name>mbuf_packet:</zone-name>
<zone-size>256</zone-size>
<count-limit>180000</count-limit>
<used>256</used>
<free>128</free>
<zone-req>49791</zone-req>
<zone-name>mbuf:</zone-name>
<zone-size>256</zone-size>
<count-limit>180000</count-limit>
<used>50</used>
<free>466</free>
```

```
<zone-req>105183</zone-req>
<zone-name>mbuf_cluster:</zone-name>
<zone-size>2048</zone-size>
<count-limit>25190</count-limit>
<used>387</used>
<free>165</free>
<zone-req>5976</zone-req>
<zone-name>mbuf_jumbo_pagesize:</zone-name>
<zone-size>4096</zone-size>
<count-limit>0</count-limit>
<used>0</used>
<free>0</free>
<zone-req>0</zone-req>
<zone-name>mbuf_jumbo_9k:</zone-name>
<zone-size>9216</zone-size>
<count-limit>0</count-limit>
<used>0</used>
<free>0</free>
<zone-req>0</zone-req>
<zone-name>mbuf_jumbo_16k:</zone-name>
<zone-size>16384</zone-size>
<count-limit>0</count-limit>
<used>0</used>
<free>0</free>
<zone-req>0</zone-req>
<zone-name>ACL UMA zone:</zone-name>
<zone-size>388</zone-size>
<count-limit>0</count-limit>
<used>0</used>
<free>0</free>
<zone-req>0</zone-req>
<zone-name>g_bio:</zone-name>
<zone-size>132</zone-size>
<count-limit>0</count-limit>
<used>0</used>
<free>174</free>
<zone-req>69750</zone-req>
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<count-limit>0</count-limit>
<used>0</used>
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<zone-req>5030</zone-req>
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<free>0</free>
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<count-limit>1000004</count-limit>
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<free>102</free>
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<zone-name>VNODE:</zone-name>
<zone-size>292</zone-size>
<count-limit>0</count-limit>
<used>2718</used>
<free>25</free>
<zone-req>2922</zone-req>
```

```
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<zone-size>72</zone-size>
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<free>0</free>
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<zone-size>68</zone-size>
<count-limit>0</count-limit>
<used>2500</used>
<free>76</free>
<zone-req>3824</zone-req>
<zone-name>L VFS Cache:</zone-name>
<zone-size>291</zone-size>
<count-limit>0</count-limit>
<used>51</used>
<free>14</free>
<zone-req>63</zone-req>
<zone-name>NAMEI:</zone-name>
<zone-size>1024</zone-size>
<count-limit>0</count-limit>
<used>0</used>
<free>8</free>
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<count-limit>0</count-limit>
<used>0</used>
<free>0</free>
<zone-req>0</zone-req>
<zone-name>NFSNODE:</zone-name>
<zone-size>460</zone-size>
<count-limit>0</count-limit>
<used>0</used>
<free>0</free>
<zone-req>0</zone-req>
<zone-name>PIPE:</zone-name>
<zone-size>404</zone-size>
<count-limit>0</count-limit>
<used>27</used>
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<zone-req>717</zone-req>
<zone-name>KNOTE:</zone-name>
<zone-size>72</zone-size>
<count-limit>0</count-limit>
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<free>64</free>
<zone-req>3311</zone-req>
<zone-name>socket:</zone-name>
<zone-size>412</zone-size>
<count-limit>25191</count-limit>
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<free>8</free>
<zone-req>2524</zone-req>
<zone-name>unpcb:</zone-name>
<zone-size>140</zone-size>
<count-limit>25200</count-limit>
<used>170</used>
<free>26</free>
<zone-req>2157</zone-req>
<zone-name>ipq:</zone-name>
```

```
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<count-limit>216</count-limit>
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<free>0</free>
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<count-limit>25194</count-limit>
<used>19</used>
<free>32</free>
<zone-req>31</zone-req>
<zone-name>inpcb:</zone-name>
<zone-size>232</zone-size>
<count-limit>25194</count-limit>
<used>40</used>
<free>28</free>
<zone-req>105</zone-req>
<zone-name>tcpcb:</zone-name>
<zone-size>520</zone-size>
<count-limit>25193</count-limit>
<used>40</used>
<free>16</free>
<zone-req>105</zone-req>
<zone-name>tcptw:</zone-name>
<zone-size>56</zone-size>
<count-limit>5092</count-limit>
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<free>0</free>
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<count-limit>15360</count-limit>
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<free>60</free>
<zone-req>55</zone-req>
<zone-name>tcpreass:</zone-name>
<zone-size>20</zone-size>
<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>
<zone-req>0</zone-req>
<zone-name>ripcb:</zone-name>
<zone-size>232</zone-size>
<count-limit>25194</count-limit>
<used>5</used>
<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>
<zone-name>FFS inode:</zone-name>
<zone-size>132</zone-size>
```

```

    <count-limit>0</count-limit>
    <used>1146</used>
    <free>72</free>
    <zone-req>1306</zone-req>
    <zone-name>FFS1 dinode:</zone-name>
    <zone-size>128</zone-size>
    <count-limit>0</count-limit>
    <used>1146</used>
    <free>24</free>
    <zone-req>1306</zone-req>
    <zone-name>FFS2 dinode:</zone-name>
    <zone-size>256</zone-size>
    <count-limit>0</count-limit>
    <used>0</used>
    <free>0</free>
    <zone-req>0</zone-req>
</vmstat-memstat-zone>
<vmstat-sumstat>
    <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>
    <kernel-thrds>60</kernel-thrds>
    <fork-calls>1313</fork-calls>
    <vfork-calls>21</vfork-calls>
    <rfork-calls>0</rfork-calls>
    <swap-pageins>0</swap-pageins>
    <swap-pagedin>0</swap-pagedin>
    <swap-pageouts>0</swap-pageouts>
    <swap-pagedout>0</swap-pagedout>
    <vnode-pageins>23094</vnode-pageins>
    <vnode-pagedin>23119</vnode-pagedin>
    <vnode-pageouts>226</vnode-pageouts>
    <vnode-pagedout>3143</vnode-pagedout>
    <page-daemon-wakeup>0</page-daemon-wakeup>
    <page-daemon-examined-pages>0</page-daemon-examined-pages>
    <pages-reactivated>8821</pages-reactivated>
    <copy-on-write-faults>48364</copy-on-write-faults>
    <copy-on-write-optimized-faults>31</copy-on-write-optimized-faults>
    <zero-fill-pages-zeroed>74665</zero-fill-pages-zeroed>
    <zero-fill-pages-prezeroed>70061</zero-fill-pages-prezeroed>
    <transit-blocking-page-faults>85</transit-blocking-page-faults>
    <total-vm-faults>191824</total-vm-faults>

<pages-affected-by-kernel-thrd-creat>0</pages-affected-by-kernel-thrd-creat>
    <pages-affected-by-fork>95343</pages-affected-by-fork>
    <pages-affected-by-vfork>3526</pages-affected-by-vfork>
    <pages-affected-by-rfork>0</pages-affected-by-rfork>
    <pages-freed>221502</pages-freed>
    <pages-freed-by-daemon>0</pages-freed-by-daemon>
    <pages-freed-by-exiting-proc>75630</pages-freed-by-exiting-proc>
    <pages-active>45826</pages-active>
    <pages-inactive>13227</pages-inactive>
    <pages-in-vm-cache>49278</pages-in-vm-cache>
    <pages-wired-down>10640</pages-wired-down>
    <pages-free>70706</pages-free>
    <bytes-per-page>4096</bytes-per-page>
    <swap-pages-used>0</swap-pages-used>
    <peak-swap-pages-used>0</peak-swap-pages-used>
    <total-name-lookups>214496</total-name-lookups>

```

```
<positive-cache-hits>92</positive-cache-hits>
<negative-cache-hits>5</negative-cache-hits>
<pass2>0</pass2>
<cache-deletions>0</cache-deletions>
<cache-falsehits>0</cache-falsehits>
<toolong>0</toolong>
</vmstat-sumstat>
<vmstat-intr>
  <intr-name>irq0: clk      </intr-name>
  <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>
</system-virtual-memory-information>
<cli>
  <banner></banner>
</cli>
</rpc-reply>
```

show task

| | |
|---------------------------------|---|
| Syntax | show task <logical-system (all <i>logical-system-name</i>)> <summary> <task-name> |
| 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> |
| Required Privilege Level | view |
| Related Documentation | <ul style="list-style-type: none"> • show task io on page 351 • show task memory on page 353 |
| List of Sample Output | show task on page 350 |
| Output Fields | Table 14 on page 349 describes the output fields for the show task command. Output fields are listed in the approximate order in which they appear. |

Table 14: 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. |
| Pro | IP protocol number associated with the process. |
| Port | TCP or UDP port number associated with the task. |
| So | Socket number of the task. |

Table 14: show task Output Fields (*continued*)

| Field Name | Field Description |
|--------------|---|
| 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 351 |
| Output Fields | Table 15 on page 351 describes the output fields for the show task io command. Output fields are listed in the approximate order in which they appear. |

Table 15: 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

```

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 354 show task memory detail on page 355 |
| Output Fields | Table 16 on page 353 describes the output fields for the show task memory command. Output fields are listed in the approximate order in which they appear. |

Table 16: 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 |
| %Available | Percentage of memory currently available. | none specified, brief |
| When | Timestamp. | none specified, brief , history |

Table 16: 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) %Available 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 user@host> show task memory detail

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      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 graceful Routing Engine switchover (GRES) and 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 357 show task replication (Issued on the Backup Routing Engine) on page 358 |
| Output Fields | Table 17 on page 357 lists the output fields for the show task replication command. Output fields are listed in the approximate order in which they appear. |

Table 17: 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 user@host> show task replication
(Issued on the Master Stateful Replication: Enabled
Routing Engine)      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) | <code>user@host> show task replication</code> 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>device-name</i> all> |
| Syntax (QFX Series) | show version <brief detail> <component <i>device-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—(QFabric switches only) (Optional) Display the host name and version information about the software running on all of the devices on the QFabric.</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> |

all—(QFabric switches only) (Optional) Display the host name and version information about the software running on all of the components on the QFabric.

component *component-name*—(QFabric switches only) (Optional) Display the host name and version information about the software running on a specific QFabric component. Replace *component-name* with the name of the QFabric 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).

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 (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 (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 361](#)
[show version \(TX Matrix Plus Router\) on page 361](#)
[show version \(MX Series Router\) on page 366](#)
[show version \(QFX3500 Switch\) on page 366](#)
[show version \(QFabric Switch\) on page 366](#)
[show version component all \(QFabric Switch\) on page 366](#)

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:
```

```
-----
      Type InUse MemUse HighUse Requests Size(s)
file desc 164 35K - 4034 16,1024,2048,16384
sigio 1 1K - 50 32
kenv 28 5K - 31 16,32,64,131072
kqueue 5 3K - 119 1024,4096,32768
proc-args 66 3K - 2951 16,32,64,128,256,512,1024,2048
zombie 0 0K - 3513 128
ithread 100 7K - 100 16,64,256
CAM queue 3 1K - 3 16
KTRACE 100 10K - 100 128
entropy 1024 64K - 1024 64
USB 127 10K - 127 16,32,64,128,256,1024,2048
linker 485 6216K - 1166 16,32,64,4096,32768,131072
USBdev 10 1K - 34 16,128,2048,16384
lockf 50 4K - 64872 64
devbuf 21086 15337K - 21661
16,32,64,128,256,512,1024,2048,4096,16384,32768,65536,131072
temp 1249 149K - 9479
16,32,64,128,256,512,2048,4096,16384,32768,65536,131072
ip6ndp 0 0K - 4 64
in6ifmulti 1 1K - 1 64
in6greentry 1 1K - 1 64
iftable 13 3K - 14 16,64,4096
iflogical 17 4K - 24 64,2048
iffamily 45 6K - 63 32,1024,2048
rtnextthop 206 36K - 380
16,32,64,256,512,1024,2048,4096,8192,16384
```

| | | | | | |
|--|------|-------|---|---------|---------------------------------------|
| metrics | 5 | 1K | - | 25 | 256 |
| inifmulti | 6 | 1K | - | 12 | 64 |
| ingrentry | 12 | 1K | - | 24 | 64 |
| rnode | 126 | 3K | - | 240 | 16, 32 |
| rcache | 4 | 8K | - | 4 | 65536 |
| tagnh | 10 | 2K | - | 20 | 256 |
| ifdevice | 11 | 8K | - | 11 | 16, 32768 |
| ifstat | 2817 | 2765K | - | 2825 | 16, 32, 1024, 16384, 32768, 65536 |
| ipfw | 32 | 22K | - | 43 | |
| 16, 32, 64, 128, 256, 512, 16384, 32768, 65536, 131072 | | | | | |
| ifmaddr | 399 | 11K | - | 435 | 16, 32 |
| rtable | 208 | 19K | - | 340 | 16, 32, 64, 128, 1024, 16384 |
| sysctl | 0 | 0K | - | 1188265 | 16, 32, 64, 4096, 16384, 32768 |
| ifaddr | 45 | 3K | - | 57 | 32, 64, 128 |
| mkey | 354 | 6K | - | 4690 | 16, 128 |
| pfe_ipc | 0 | 0K | - | 11456 | |
| 16, 32, 64, 128, 256, 512, 1024, 2048, 4096, 8192, 16384, 32768, 65536, 131072 | | | | | |
| ifstate | 5961 | 435K | - | 6846 | |
| 16, 32, 64, 128, 256, 512, 1024, 2048, 4096, 16384, 32768 | | | | | |
| itable16 | 249 | 39K | - | 294 | 256, 4096 |
| itable32 | 148 | 5K | - | 148 | 32 |
| itable64 | 2 | 1K | - | 2 | 64 |
| lr | 1 | 1K | - | 1 | 16384 |
| pic | 29 | 3K | - | 29 | 64, 16384 |
| pfestat | 0 | 0K | - | 2820 | 32, 128, 65536 |
| gencfg | 1499 | 200K | - | 6086 | |
| 16, 32, 64, 128, 512, 4096, 16384, 32768, 65536 | | | | | |
| jsr | 2 | 1K | - | 10 | 16 |
| idl | 1 | 4K | - | 121 | |
| 32, 64, 128, 256, 512, 1024, 2048, 4096, 16384, 32768, 65536, 131072 | | | | | |
| rtmsg | 0 | 0K | - | 16 | 131072 |
| DEVFS2 | 108 | 2K | - | 108 | 16 |
| DEVFS3 | 204 | 23K | - | 205 | 256 |
| module | 247 | 16K | - | 247 | 64, 128 |
| mtx_pool | 1 | 8K | - | 1 | |
| DEVFS1 | 108 | 27K | - | 108 | 4096 |
| pgrp | 20 | 2K | - | 275 | 64 |
| session | 14 | 2K | - | 173 | 512 |
| proc | 2 | 1K | - | 2 | 16384 |
| subproc | 302 | 601K | - | 3815 | 4096, 131072 |
| cred | 45 | 5K | - | 33092 | 256 |
| plimit | 22 | 5K | - | 1363 | 2048 |
| uidinfo | 3 | 1K | - | 6 | 32, 512 |
| sysctlold | 2548 | 78K | - | 2548 | 16, 32, 64 |
| sysctltmp | 0 | 0K | - | 1449 | 16, 32, 64, 1024 |
| umtx | 162 | 11K | - | 162 | 64 |
| SWAP | 2 | 277K | - | 2 | 64 |
| bus | 781 | 126K | - | 3263 | 16, 32, 64, 128, 32768 |
| bus-sc | 67 | 62K | - | 1623 | |
| 16, 32, 64, 512, 1024, 4096, 16384, 65536, 131072 | | | | | |
| DEVFS | 14 | 1K | - | 15 | 16, 64 |
| devstat | 8 | 17K | - | 8 | 16, 131072 |
| eventhandler | 42 | 2K | - | 42 | 32, 128 |
| kobj | 93 | 186K | - | 111 | 65536 |
| rman | 106 | 7K | - | 490 | 16, 32, 64 |
| sbuf | 0 | 0K | - | 1112 | 16, 32, 32768, 131072 |
| NULLFS hash | 1 | 1K | - | 1 | 64 |
| taskqueue | 5 | 1K | - | 5 | 64 |
| turnstiles | 163 | 11K | - | 163 | 64 |
| Unitno | 6 | 1K | - | 10 | 16, 64 |
| ioctlops | 0 | 0K | - | 477380 | 16, 32, 64, 128, 16384, 65536, 131072 |

| | | | | | |
|---|------|------|---|--------|--|
| iov | 0 | OK | - | 49032 | 16,64,128,256,512,1024,2048,131072 |
| msg | 4 | 25K | - | 4 | 32768,131072 |
| sem | 4 | 7K | - | 4 | 16384,32768,131072 |
| shm | 3 | 14K | - | 8 | 32768 |
| ttys | 412 | 60K | - | 863 | 512,32768 |
| ptys | 4 | 1K | - | 4 | 128 |
| mbextcnt | 0 | OK | - | 42 | 16 |
| soname | 104 | 11K | - | 104726 | 16,32,64,256 |
| pcb | 256 | 32K | - | 1097 | |
| 16,32,64,128,1024,2048,4096,16384,32768,65536 | | | | | |
| BIIO buffer | 44 | 88K | - | 723 | 65536 |
| vfscache | 1 | 512K | - | 1 | |
| cluster_save buffer | 0 | OK | - | - | 30 32,64 |
| VFS hash | 1 | 256K | - | 1 | |
| vnodes | 1 | 1K | - | 1 | 512 |
| mount | 274 | 23K | - | 489 | 16,32,64,128,256,4096,32768 |
| vnodemarker | 0 | OK | - | 1699 | 16384 |
| pfs_nodes | 25 | 3K | - | 25 | 128 |
| pfs_vncache | 227 | 8K | - | 429 | 32 |
| GEOM | 173 | 15K | - | 1068 | |
| 16,32,64,128,256,512,2048,16384,32768,131072 | | | | | |
| STP | 1 | 1K | - | 1 | 64 |
| CAM dev queue | 1 | 1K | - | 1 | 64 |
| syncache | 1 | 8K | - | 1 | |
| tlv_stat | 0 | OK | - | 238 | |
| NFS daemon | 1 | 8K | - | 1 | |
| pagedep | 1 | 64K | - | 124 | 64 |
| inodedep | 1 | 256K | - | 605 | 256 |
| newblk | 1 | 1K | - | 611 | 64,4096 |
| bmsafemap | 0 | OK | - | 47 | 64 |
| allocdirect | 0 | OK | - | 605 | 128 |
| indirdep | 0 | OK | - | 6 | 32 |
| allocindir | 0 | OK | - | 5 | 64 |
| freefrag | 0 | OK | - | 91 | 32 |
| freeblks | 0 | OK | - | 93 | 2048 |
| freefile | 0 | OK | - | 161 | 32 |
| diradd | 0 | OK | - | 603 | 64 |
| mkdir | 0 | OK | - | 166 | 32 |
| dirrem | 0 | OK | - | 312 | 32 |
| newdirblk | 0 | OK | - | 1 | 32 |
| savedino | 0 | OK | - | 294 | 512 |
| UFS mount | 15 | 36K | - | 15 | 4096,65536,131072 |
| UMAHash | 1 | 16K | - | 7 | 4096,16384,32768,65536,131072 |
| MD disk | 9 | 18K | - | 9 | 65536 |
| ata_generic | 2 | 2K | - | 21 | 16,16384,32768 |
| ISOFS mount | 7 | 1K | - | 13 | 512 |
| VM pgdata | 2 | 65K | - | 2 | 64 |
| ISOFS node | 1405 | 132K | - | 1419 | 128 |
| CAM SIM | 1 | 1K | - | 1 | 64 |
| atkbddev | 2 | 1K | - | 2 | 32 |
| Gzip trees | 0 | OK | - | 470292 | 32,64,128,1024,8192,32768,65536,131072 |
| | | | | | |
| CAM XPT | 6 | 1K | - | 9 | 16,64,16384 |
| isadev | 23 | 2K | - | 23 | 64 |
| CAM periph | 1 | 1K | - | 1 | 128 |
| I/O APIC | 1 | 1K | - | 1 | 32768 |
| ad_driver | 2 | 1K | - | 2 | 256 |
| legacydrv | 3 | 1K | - | 3 | 16 |
| memdesc | 1 | 4K | - | 1 | 131072 |
| MP Table | 1 | 1K | - | 1 | 128 |
| nexusdev | 2 | 1K | - | 2 | 16 |

| | ata_dma | 6 | 1K | - | 6 | 256 | |
|----------------------|---------|----------|---------|--------|----------|-----------------------|--|
| | cdev | 26 | 3K | - | 26 | 256 | |
| | kbdmux | 5 | 9K | - | 5 | 128,4096,65536,131072 | |
| ITEM | SIZE | LIMIT | USED | FREE | REQUESTS | | |
| UMA Kegs: | 136, | 0, | 69, | 3, | 69 | | |
| UMA Zones: | 120, | 0, | 69, | 21, | 69 | | |
| UMA Slabs: | 64, | 0, | 1681, | 30, | 17268 | | |
| UMA RCntSlabs: | 104, | 0, | 2419, | 23, | 2419 | | |
| UMA Hash: | 128, | 0, | 4, | 26, | 5 | | |
| 16 Bucket: | 76, | 0, | 32, | 18, | 32 | | |
| 32 Bucket: | 140, | 0, | 35, | 21, | 35 | | |
| 64 Bucket: | 268, | 0, | 32, | 10, | 32 | | |
| 128 Bucket: | 524, | 0, | 105, | 0, | 105 | | |
| VM OBJECT: | 128, | 0, | 3767, | 193, | 69113 | | |
| MAP: | 160, | 0, | 7, | 41, | 7 | | |
| KMAP ENTRY: | 68, | 44352, | 26, | 142, | 40036 | | |
| MAP ENTRY: | 68, | 0, | 2718, | 474, | 195484 | | |
| PV ENTRY: | 24, | 1259180, | 107193, | 12722, | 5133143 | | |
| DP fakepg: | 72, | 0, | 0, | 0, | 0 | | |
| mt_zone: | 64, | 0, | 231, | 64, | 231 | | |
| 16: | 16, | 0, | 4447, | 222, | 1707104 | | |
| 32: | 32, | 0, | 5559, | 204, | 427638 | | |
| 64: | 64, | 0, | 23128, | 59, | 191981 | | |
| 96: | 96, | 0, | 3628, | 92, | 36576 | | |
| 112: | 112, | 0, | 782, | 93, | 51883 | | |
| 128: | 128, | 0, | 727, | 143, | 2028 | | |
| 160: | 160, | 0, | 1041, | 39, | 9623 | | |
| 208: | 208, | 0, | 302, | 40, | 5625 | | |
| 256: | 256, | 0, | 627, | 18, | 4296 | | |
| 272: | 272, | 0, | 48, | 22, | 3160 | | |
| 512: | 512, | 0, | 666, | 14, | 5529 | | |
| 1024: | 1024, | 0, | 420, | 12, | 15128 | | |
| 2048: | 2048, | 0, | 1909, | 17, | 13067 | | |
| 4096: | 4096, | 0, | 228, | 19, | 7877 | | |
| Files: | 72, | 0, | 586, | 103, | 124488 | | |
| PROC: | 544, | 0, | 139, | 22, | 3652 | | |
| THREAD: | 416, | 0, | 161, | 1, | 162 | | |
| KSEGRP: | 88, | 0, | 161, | 39, | 162 | | |
| UPCALL: | 44, | 0, | 0, | 0, | 0 | | |
| SLEEPQUEUE: | 32, | 0, | 163, | 176, | 163 | | |
| VMSPACE: | 268, | 0, | 66, | 18, | 3569 | | |
| mbuf_packet: | 256, | 180000, | 256, | 128, | 27221 | | |
| mbuf: | 256, | 180000, | 4110, | 501, | 2286155 | | |
| mbuf_cluster: | 2048, | 30000, | 4487, | 351, | 697551 | | |
| mbuf_jumbo_pagesize: | 4096, | | 0, | 0, | 0, | 0 | |
| mbuf_jumbo_9k: | 9216, | 0, | 0, | 0, | 0 | | |
| mbuf_jumbo_16k: | 16384, | 0, | 0, | 0, | 0 | | |
| ACL UMA zone: | 388, | 0, | 0, | 0, | 0 | | |
| g_bio: | 132, | 0, | 0, | 290, | 97288 | | |
| ata_request: | 200, | 0, | 0, | 76, | 5910 | | |
| ata_composite: | 192, | 0, | 0, | 0, | 0 | | |
| VNODE: | 292, | 0, | 4128, | 32, | 4583 | | |
| VNODEPOLL: | 72, | 0, | 0, | 0, | 0 | | |
| S VFS Cache: | 68, | 0, | 3890, | 86, | 9271 | | |
| L VFS Cache: | 291, | 0, | 17, | 22, | 24 | | |
| NAMEI: | 1024, | 0, | 0, | 36, | 341732 | | |
| NFSMOUNT: | 480, | 0, | 0, | 0, | 0 | | |
| NFSNODE: | 460, | 0, | 0, | 0, | 0 | | |
| PIPE: | 404, | 0, | 29, | 7, | 1825 | | |
| KNOTE: | 72, | 0, | 35, | 71, | 15004 | | |

| | | | | | |
|--------------|------|---------|-------|------|------|
| socket: | 412, | 30006, | 352, | 26, | 4683 |
| ipq: | 52, | 288, | 0, | 0, | 0 |
| udpcb: | 224, | 30005, | 24, | 27, | 232 |
| inpcb: | 224, | 30005, | 35, | 33, | 140 |
| tcpcb: | 520, | 30002, | 35, | 7, | 140 |
| tcptw: | 56, | 6030, | 0, | 134, | 66 |
| syncache: | 128, | 15360, | 0, | 60, | 41 |
| tcpreass: | 20, | 2028, | 0, | 0, | 0 |
| sackhole: | 20, | 0, | 0, | 0, | 0 |
| ripcb: | 224, | 30005, | 5, | 29, | 7 |
| unpcb: | 140, | 30016, | 150, | 46, | 3791 |
| SWAPMETA: | 276, | 121576, | 0, | 0, | 0 |
| FFS inode: | 132, | 0, | 2385, | 51, | 2622 |
| FFS1 dinode: | 128, | 0, | 2385, | 45, | 2622 |
| FFS2 dinode: | 256, | 0, | 0, | 0, | 0 |

```

19933113 cpu context switches
5244831 device interrupts
154821 software interrupts
459702 traps
8357837 system calls
    76 kernel threads created
3442 fork() calls
134 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
504 vnode pager pageins
538 vnode pager pages paged in
380 vnode pager pageouts
3646 vnode pager pages paged out
    0 page daemon wakeups
    0 pages examined by the page daemon
56570 pages reactivated
127752 copy-on-write faults
    39 copy-on-write optimized faults
200992 zero fill pages zeroed
196746 zero fill pages prezeroed
    27 intransit blocking page faults
443499 total VM faults taken
    0 pages affected by kernel thread creation
441644 pages affected by fork()
52141 pages affected by vfork()
    0 pages affected by rfork()
420183 pages freed
    0 pages freed by daemon
206284 pages freed by exiting processes
52228 pages active
56648 pages inactive
52413 pages in VM cache
17956 pages wired down
654199 pages free
    4096 bytes per page
    0 swap pages used
    0 peak swap pages used
1295493 total name lookups
    cache hits (93% pos + 5% neg) system 0% per-directory
    deletions 0%, falsehits 0%, toolong 0%
interrupt                                total      rate

```

```
irq4: sio0                      5131      1
irq16: uhci0 uhci*              164201    40
irq17: uhci1 uhci*              386684    95
cpu0: timer                     8131301   2017
Total                           8687317   2155
vm.kmem_map_free: 618377216
```

```
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 Switch) user@qfabric> show version
Hostname: qfabric
Model: qfx3000
Serial Number: qfsn-0123456789
QFabric System ID: f158527a-f99e-11e0-9fbd-00e081c57cda
JUNOS Base Version [11.3I20111018_0215_dc-builder]
```

```
show version component all user@switch> show version component all
(QFabric Switch) 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 | <code>start shell (csh sh)</code> <code><user username></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 | Exit from the CLI environment and create a UNIX-level shell. To return to the CLI, type exit from the shell. |
| <div>  <p>NOTE:</p> <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 | <p>csh—Create a UNIX C shell.</p> <p>sh—Create a UNIX Bourne shell.</p> <p>user <i>username</i>—(Optional) Start the shell as another user.</p> |
| Additional Information | <p>When you are in the shell, the shell prompt has the following format:</p> <p><i>username@hostname%</i></p> <p>An example of the prompt is:</p> <p>root@host%</p> |
| Required Privilege Level | shell and maintenance |
| List of Sample Output | start shell csh on page 369 |
| 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 <i>filename</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 | Verify that the syntax of a configuration file is correct. If the configuration contains any errors, a message is displayed to indicate the line number and column number in which the error was found. |
| Options | <i>filename</i> —Name of the configuration file. |
| Required Privilege Level | view |
| List of Sample Output | test configuration on page 371 |
| 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

Index

- [Index on page 375](#)

Index

Symbols

| | |
|--|-----|
| #, comments in configuration statements..... | xvi |
| (), in syntax descriptions..... | xvi |
| /altconfig directory | |
| altconfig file system..... | 173 |
| /altroot directory | |
| altroot file system..... | 173 |
| /config directory | |
| config file system..... | 173 |
| 64-bit | |
| Upgrade Routing Engine Junos OS..... | 77 |
| < >, in syntax descriptions..... | xvi |
| [], in configuration statements..... | xvi |
| { }, in configuration statements..... | xvi |
| (pipe), in syntax descriptions..... | xvi |

A

| | |
|--|-----|
| aborting partitioning operation..... | 161 |
| access, router remotely..... | 20 |
| activating a configuration..... | 29 |
| addresses | |
| IP addresses..... | 42 |
| alias option for static-host-mapping | |
| statement..... | 117 |
| alias statement..... | 117 |
| /altconfig directory..... | 32 |
| /altroot directory..... | 32 |
| announcement statement..... | 89 |
| usage guidelines..... | 66 |
| announcements | |
| system login..... | 66 |
| archival configuration | |
| displaying..... | 194 |
| archival statement..... | 90 |
| usage guidelines..... | 52 |
| archive router configuration..... | 51 |
| archive-sites statement | |
| configuration files..... | 91 |
| usage guidelines..... | 52 |
| archiving files..... | 126 |
| ASCII file, Junos OS, configuring using..... | 26 |

| | |
|---------------------------------|--------|
| authentication | |
| root password..... | 54, 57 |
| user..... | 21 |
| autoinstallation statement..... | 92 |
| auxiliary port | |
| properties..... | 60 |
| auxiliary statement | |
| usage guidelines..... | 60 |

B

| | |
|--|--------|
| backing up partitions..... | 173 |
| backup router configuration..... | 51 |
| backup routers..... | 48, 93 |
| backup software, displaying information..... | 233 |
| backup-router statement..... | 93 |
| usage guidelines..... | 48 |
| BOOTP relay agent..... | 62 |
| braces, in configuration statements..... | xvi |
| brackets | |
| angle, in syntax descriptions..... | xvi |
| square, in configuration statements..... | xvi |

C

| | |
|---|---------------|
| change-type statement | |
| usage guidelines..... | 57 |
| checksum | |
| calculating for a file..... | 128, 129, 130 |
| clear system commit command..... | 144 |
| clear system reboot command..... | 145 |
| CLI | |
| exiting to create UNIX-level shell..... | 369 |
| Junos OS, configuring using..... | 26, 27 |
| commands | |
| filenames, specifying..... | 30 |
| URLs, specifying..... | 30 |
| comments, in configuration statements..... | xvi |
| commit operations, pending | |
| clearing..... | 144 |
| displaying..... | 192 |
| commit scripts | |
| Junos OS, configuring using..... | 26, 28 |
| commit synchronize command..... | 71 |
| commit synchronize statement..... | 94 |
| usage guidelines..... | 61 |
| CompactFlash cards | |
| mirroring to hard disk..... | 50 |
| comparing files..... | 131 |
| compress-configuration-files statement..... | 95 |
| usage guidelines..... | 61 |

| | |
|--|---------------|
| compressing configuration files..... | 61, 95 |
| compressing files..... | 126 |
| /config directory | |
| location of configuration files..... | 32 |
| configuration | |
| activating..... | 29 |
| deleting rescue configuration..... | 150 |
| displaying | |
| archival configuration..... | 194 |
| current configuration..... | 188 |
| previous configuration..... | 231 |
| rescue configuration..... | 195 |
| files See configuration files | |
| saving rescue configuration..... | 151 |
| syntax, verifying..... | 371 |
| configuration files | |
| compressing..... | 61, 95 |
| filename, specifying..... | 30 |
| URL, specifying..... | 30 |
| configuration mode, entering..... | 148 |
| configuration statement..... | 96 |
| usage guidelines..... | 51 |
| configuration statements | |
| specifying IP addresses in..... | 30 |
| configuration-servers statement..... | 97 |
| configure command..... | 148 |
| console port | |
| properties..... | 60 |
| console statement | |
| physical port | |
| usage guidelines..... | 60 |
| conventions | |
| text and syntax..... | xv |
| copying | |
| files..... | 134 |
| core dump files | |
| usage guidelines..... | 63 |
| viewing..... | 63 |
| curly braces, in configuration statements..... | xvi |
| current time, displaying..... | 288 |
| customer support..... | xvii |
| contacting JTAC..... | xvii |
| D | |
| deleting | |
| files..... | 136 |
| destination option..... | 93 |
| DHCP/BOOTP relay agent..... | 62 |
| directories | |
| Junos OS..... | 32 |
| disk space available, displaying..... | 278 |
| disk space, available | |
| managing..... | 80 |
| DNS | |
| hostnames, displaying..... | 191 |
| DNS name servers..... | 44 |
| documentation | |
| comments on..... | xvii |
| Domain Name System See DNS | |
| domain names on routers..... | 43 |
| domain-name statement | |
| router..... | 97 |
| usage guidelines..... | 43 |
| domain-search statement..... | 98 |
| usage guidelines..... | 44 |
| domains to be searched..... | 44, 98 |
| dump-device statement..... | 99 |
| E | |
| encrypted passwords..... | 54, 57 |
| encrypted-password option..... | 54, 57 |
| events statement..... | 100 |
| export routing policies..... | 14 |
| F | |
| failover statement | |
| usage guidelines..... | 64 |
| failover, configuring..... | 64 |
| file archive command..... | 126 |
| file checksum md5 command..... | 128 |
| file checksum sha-256 command..... | 130 |
| file checksum sha1 command..... | 129 |
| file compare command..... | 131 |
| file copy command..... | 134 |
| file delete command..... | 136 |
| file list command..... | 137 |
| file rename command..... | 139 |
| file show command..... | 141 |
| file systems | |
| free disk space, displaying..... | 278 |
| partitions, backing up..... | 173 |
| filenames, specifying in commands..... | 30 |
| files | |
| archiving..... | 126 |
| calculating checksum..... | 128, 129, 130 |
| comparing..... | 131 |
| compressing..... | 126 |

- configuration files, compressing.....95
 - configuration, compressing.....61
 - contents, displaying.....141
 - copying.....134
 - deleting.....136
 - list of, displaying.....137
 - renaming.....139
 - firewall filters.....22
 - first-time router configuration.....33
 - font conventions.....xv
 - forwarding table.....13
 - free disk space, displaying.....278
- G**
- global tracing operations.....16
 - graceful switchover, displaying.....284
- H**
- halts
 - pending
 - clearing.....145
 - displaying.....228
 - requesting.....152
 - hard disk
 - mirroring CompactFlash cards.....50
 - partitioning
 - aborting.....161
 - requesting.....163
 - hardware components.....7
 - host-name statement.....100
 - usage guidelines.....41
 - hostnames, DNS, displaying.....191
- I**
- I/O statistics, routing protocol tasks,
 - displaying.....351
 - import routing policies.....14
 - inet statement.....117
 - usage guidelines.....41
 - inet6-backup-router statement.....101
 - usage guidelines.....48
 - initial configuration
 - Junos OS.....33
 - insecure statement
 - usage guidelines.....60
 - installing software.....179
 - interfaces
 - tracing operations.....17
 - interfaces statement.....102
- IP addresses.....41
 - router mapping.....42
 - router names, mapping.....41
 - specifying in configuration statements.....30
- J**
- J Series Services Routers.....5
 - J-Web graphical user interface (GUI)
 - Junos OS, configuring using.....26, 27
 - juniper.conf file, compressing.....61, 95
 - Junos OS.....33
 - directories stored in.....32
 - disk space, displaying.....278
 - halt, requesting a.....152
 - loaded extensions, displaying.....236
 - methods for configuring.....26
 - ASCII file.....26, 27
 - CLI.....26, 27
 - CLI, ASCII file, J-Web GUI.....26
 - commit scripts.....26, 28
 - J-Web GUI.....26, 27
 - Junos XML management protocol.....26, 28
 - NETCONF XML management
 - protocol.....26, 28
 - monitoring tools.....35
 - passwords, plain-text, requirements.....21
 - pending reboots
 - clearing.....145
 - displaying.....228
 - processes, displaying.....197
 - queue statistics, displaying.....222
 - rebooting.....169
 - redundant Routing Engines, initial
 - configuration.....71
 - security, default settings.....19
 - software properties, configuring.....29
 - system statistics, displaying.....244
 - tasks, displaying
 - I/O statistics.....351
 - memory usage.....353
 - protocol.....349
 - Upgrade Routing Engine to 64-bit.....77
 - uptime, displaying.....288
 - version, displaying
 - general.....359
 - virtual memory, displaying.....292

| | |
|----------------------------------|--------|
| JUNOS Software | |
| powering off..... | 165 |
| upgrade | |
| performing..... | 179 |
| Junos XML management protocol | |
| Junos OS, configuring using..... | 26, 28 |
| Junos-FIPS | |
| dual Routing Engines..... | 7 |
| IPsec requirements..... | 7 |
| password requirements..... | 55 |

K

| | |
|---|-----|
| kernel memory usage, displaying..... | 292 |
| kernel replication state, displaying..... | 284 |

L

| | |
|----------------------------------|--------|
| licenses | |
| adding..... | 157 |
| deleting..... | 158 |
| saving..... | 159 |
| load-key-file command | |
| usage guidelines..... | 55 |
| load-key-file statement..... | 103 |
| usage guidelines..... | 54, 57 |
| location statement..... | 104 |
| usage guidelines..... | 53 |
| log-out-on-disconnect statement | |
| usage guidelines..... | 60 |
| logging operations | |
| tracing operations..... | 16 |
| logging out users..... | 160 |
| login announcements, system..... | 66 |
| login messages, system..... | 64 |
| login-tip statement..... | 105 |
| logout, users..... | 160 |

M

| | |
|--|------|
| manuals | |
| comments on..... | xvii |
| martian addresses..... | 19 |
| max-configurations-on-flash statement..... | 105 |
| usage guidelines..... | 50 |
| maximum-length statement | |
| usage guidelines..... | 57 |
| MD5 checksum, calculating..... | 128 |
| memory, displaying for tasks..... | 353 |
| message statement..... | 106 |
| usage guidelines..... | 64 |

| | |
|-------------------------------------|-----|
| messages | |
| system login..... | 64 |
| minimum-changes statement | |
| usage guidelines..... | 57 |
| minimum-length statement | |
| usage guidelines..... | 57 |
| mirror-flash-on-disk statement..... | 107 |
| usage guidelines..... | 50 |
| monitoring tools | |
| tracing operations..... | 16 |
| monitoring tools for Junos OS..... | 35 |
| MPLS routing table..... | 14 |
| multicast routing table..... | 14 |

N

| | |
|--|--------|
| name servers, DNS..... | 44 |
| name-server statement..... | 108 |
| usage guidelines..... | 44 |
| names | |
| domain names on routers..... | 43 |
| names..... | 42 |
| router | 41 |
| NETCONF XML management protocol | |
| Junos OS, configuring using..... | 26, 28 |
| network | |
| masks..... | 30 |
| no-compress-configuration-files statement..... | 95 |
| usage guidelines..... | 61 |
| no-saved-core-context statement..... | 116 |
| usage guidelines..... | 63 |

P

| | |
|---|--------|
| Packet Forwarding Engine..... | 6 |
| parentheses, in syntax descriptions..... | xvi |
| partitioning the hard disk | |
| aborting..... | 161 |
| requesting..... | 163 |
| partitions, backing up..... | 173 |
| password statement..... | 108 |
| passwords | |
| root..... | 54, 57 |
| passwords statement | |
| usage guidelines..... | 57 |
| pic-console-authentication statement..... | 109 |
| plain-text password | |
| requirements..... | 21 |
| plain-text passwords..... | 54 |
| root password..... | 54, 57 |
| plain-text-password option..... | 54, 57 |

- port statement.....110
 - ports
 - auxiliary port properties.....60
 - console port properties.....60
 - ports statement.....111
 - usage guidelines.....60
 - powering off routing software
 - requesting a system power off.....165
 - prefixes
 - specifying in configuration statements.....30
 - processes
 - configuring failover.....64, 112
 - displaying information.....197
 - processes statement.....112
 - protocol-specific tracing operations.....16
 - proxy
 - usage guidelines.....45
 - proxy server
 - configuring.....45
 - proxy statement.....113
- Q**
- queues
 - statistics, displaying.....222
- R**
- rebooting router software
 - pending reboots
 - clearing.....145
 - displaying.....228
 - requesting a system reboot.....169
 - redundancy
 - configuring failover.....64, 112
 - remote access, router, establishing.....20
 - removing
 - files.....136
 - renaming files.....139
 - replication errors, displaying.....284
 - request system configuration rescue delete
 - command.....150
 - request system configuration rescue save
 - command.....151
 - request system halt command.....152
 - request system license add command.....157
 - request system license delete command.....158
 - request system license save command.....159
 - request system logout command.....160
 - request system partition abort command.....161
 - request system partition hard-disk command.....163
 - request system power-off command.....165
 - request system reboot command.....169
 - request system snapshot command.....173
 - request system software add command.....179
 - rescue configuration
 - deleting.....150
 - displaying.....195
 - saving.....151
 - rollback
 - displaying.....231
 - root password.....54, 57
 - root-authentication statement.....114
 - usage guidelines.....54, 57
 - root-login statement.....115
 - route prefixes.....30
 - router security.....19
 - access.....20
 - firewall filters.....22
 - Junos OS, security, default settings.....19
 - routing protocol security features.....22
 - system log messages.....23
 - user authentication.....21
 - routers
 - backup.....48, 93
 - DNS name servers, configuring.....44
 - domain names.....43
 - domains to be searched.....44, 98
 - failover, configuring.....64, 112
 - hardware components.....7
 - initial configuration.....33
 - Junos OS
 - initial configuration for redundant Routing Engines.....71
 - names
 - configuring.....42
 - mapping to IP addresses.....41, 42
 - Packet Forwarding Engine.....6
 - physical system location.....53
 - ports
 - auxiliary port properties.....60
 - console port properties.....60
 - remote access, establishing.....20
 - Routing Engine.....6
 - security features.....19
 - Routing Engine
 - Upgrade to 64-bit Junos OS.....77
 - Routing Engines
 - available disk space, managing.....80
 - overview.....6

| | |
|---|-----|
| redundant | |
| Junos OS, initial configuration..... | 71 |
| single | |
| Junos OS, initial configuration..... | 66 |
| switchover information, displaying..... | 284 |
| routing protocol process | |
| IPv6 routing protocols..... | 13 |
| routing policy..... | 14 |
| routing tables..... | 13 |
| routing protocol security features..... | 22 |
| routing protocol tasks | |
| displaying..... | 349 |
| statistics, displaying..... | 351 |
| routing tables..... | 13 |

S

| | |
|---|-----------------------------------|
| saved-core-context statement..... | 116 |
| usage guidelines..... | 63 |
| saved-core-files statement..... | 116 |
| usage guidelines..... | 63 |
| security | |
| router, features..... | 19 |
| router, Junos OS default settings..... | 19 |
| server statement..... | 117 |
| sha-256 checksum, calculating..... | 130 |
| SHA-1 checksum, calculating..... | 129 |
| show configuration command..... | 188 |
| show host command..... | 191 |
| show system commit command..... | 192 |
| show system configuration archival | |
| command..... | 194 |
| show system configuration rescue command..... | 195 |
| show system processes command..... | 197 |
| show system queues command..... | 222 |
| show system reboot command..... | 228 |
| show system rollback command..... | 231 |
| show system snapshot command..... | 233 |
| show system software command..... | 236 |
| show system statistics | |
| command..... | 144, 150, 192, 244, 288, 369, 371 |
| show system storage command..... | 278 |
| show system switchover command..... | 284 |
| show system uptime command..... | 288 |
| show system virtual-memory command..... | 292 |
| show task command..... | 349 |
| show task io command..... | 351 |
| show task memory command..... | 353 |
| show task replication command..... | 357 |
| show version command..... | 359 |

| | |
|---|---------|
| software processes | |
| configuring failover..... | 64, 112 |
| SSH key files..... | 54, 57 |
| start shell command..... | 369 |
| static-host-mapping statement..... | 117 |
| usage guidelines..... | 42 |
| statistics | |
| protocol-related, displaying..... | 244 |
| routing protocol I/O, displaying..... | 351 |
| system queues, displaying..... | 222 |
| subnet masks..... | 30 |
| support, technical See technical support | |
| switchover, displaying information about..... | 284 |
| syntax conventions..... | xv |
| syntax of configuration files, verifying..... | 371 |
| sysid statement..... | 117 |
| usage guidelines..... | 42 |
| system identifier, IS-IS | |
| configuring..... | 42 |
| system log messages..... | 23 |
| system login..... | 64, 66 |
| system statement..... | 118 |
| usage guidelines..... | 83 |

T

| | |
|--|------|
| tasks | |
| I/O statistics, displaying..... | 351 |
| memory usage, displaying..... | 353 |
| protocol, displaying..... | 349 |
| technical support | |
| contacting JTAC..... | xvii |
| terminal type..... | 60 |
| terminating partitioning operation..... | 161 |
| test configuration command..... | 371 |
| time, displaying..... | 288 |
| tracing operations..... | 16 |
| transfer interval | |
| usage guidelines..... | 52 |
| transfer-interval statement | |
| archiving of configuration..... | 119 |
| transfer-on-commit statement..... | 120 |
| usage guidelines..... | 52 |
| transferring router configuration to archive site..... | 51 |
| trusted-key statement..... | 121 |
| type statement | |
| auxiliary port | |
| usage guidelines..... | 60 |
| console port | |
| usage guidelines..... | 60 |

U

| | |
|---|-----|
| unicast routing table..... | 14 |
| UNIX-level shell, creating..... | 369 |
| upgrading software | |
| performing..... | 179 |
| uptime, displaying..... | 288 |
| URLs, specifying in commands..... | 30 |
| user authentication | |
| methods..... | 21 |
| protocols for central authentication..... | 21 |
| router security..... | 21 |
| users | |
| logging users out..... | 160 |

V

| | |
|---|-----|
| /var/db/config directory..... | 32 |
| /var directory..... | 32 |
| /var/home directory..... | 32 |
| /var/log directory..... | 32 |
| verifying syntax of configuration file..... | 371 |
| version | |
| software, displaying | |
| general..... | 359 |
| virtual memory, displaying..... | 292 |
| VPNs..... | 15 |

